VOL XXV. No. 1.

ARCHIVES OF OTOLOGY.

A CASE OF CAROTID ARTERY HEMORRHAGE WITH MIDDLE-EAR NECROSIS; OPERATIONS.

By ROBERT ABBE, M.D.

On October 12, 1895, a child two and a half years old was brought to my service in the Post-Graduate Babies' Wards for treatment of purulent otitis of the left ear, existing for one year.

It was not a sequel of any sickness known to the parents. The discharge was offensive, the child in poor condition. The ear was syringed with boracic acid solution, and iodoform emulsion dropped in for a few days until some improvement of its health might be obtained.

Its temperature was 100° F. at first but became normal in two days.

On the third day, at two o'clock in the afternoon, while the child was quiet in its bed, the ward nurse who happened to be near noticed that the child's pillow and dress were suddenly saturated with blood down to its knees—and that blood was pouring from its ear. She immediately plugged the latter with her finger and sent for the house surgeon who replaced the finger pressure by an iodoform plug. The blood welled up from the ear as quickly as the finger was withdrawn.

I saw the child two hours later. He was extremely blanched, and it was estimated he might have lost six or eight ounces of blood.

On the following day the child was in fair condition for operation.

There was an old scar behind the ear leading to the mastoid.

My belief was that mastoid or temporal necrosis had eroded the lateral sinus.

I found the mastoid healthy. I exposed the wall of the lateral sinus and, by extending the trephine opening, the floor of the middle fossa also. No evidence of disease appeared. I passed a

probe along the petrous portion toward its apex but there was no necrosis there.

Removing the plug I found the bleeding had stopped, and exploring the canal for necrosis the probe touched bare bone in the tympanic cavity and immediately loosened a flood of blood which at the moment seemed dark as if from the sinus. A plug of gauze again stopped it and the child was put to bed to await developments.

There was no swelling over the jugular at this time.

Two days later the temperature rose suddenly to 104½° preceded by convulsive twitchings of the right half of the body. Both eyes rolled to the left and upward.

The temperature fell quickly to 102½° and the patient had a quiet night. Food was retained ; there was no vomiting and no loss of consciousness.

October 19th. Four and a half days after the hemorrhage I again ventured to operate, intending to shut off the jugular and mastoid, thus preventing a recurrence of venous hemorrhage and carrying out Ballance's operation.

I tied the jugular first, after removing several enlarged glands overlying it. I explored the lateral sinus, drawing blood by a sterile hypodermic and finding it fluid.

As it was not thrombosed I cut it across and plugged it with iodoform gauze. Feeling secure, I now removed the plug from the meatus and no blood flowed. I left this plug out to give exit for possible pus.

The child rallied well and lived thirty-six hours. No bleeding occurred but he succumbed to exhaustion.

A careful examination by Prof. E. K. Dunham, of the blood drawn from the sinus showed it to be sterile to cultures and normal on microscopical examination.

A careful *autopsy* revealed the following conditions:

Adhesion of the dura over a large abscess of the cortical portion of the posterior occipito-parietal convolutions.

The dura and brain about the temporal bone normal. No evidence of necrosis appeared within the skull.

The lateral sinus and jugular were plugged with a sound and healthy thrombus between the gauze plug and ligature. The carotid artery was plugged by a septic thrombus which had evidently discharged an embolus to the middle cerebral

artery and resulted in abscess necrosis of cerebral tissue. A very careful section of the temporal bone made by Dr. Theodore Dunham, with microscopical reports by Prof. E. K. Dunham of Bellevue, showed a small loose sequestrum of the middle ear, apparently a part of the cochlea, in contact with an erosion of the bend of the carotid artery about one third of its circumference.

Endarteritis had plugged the artery, but at the time of hemorrhages this must have been only partial.

The destructive process was limited to the tympanic cavity and adjacent walls, but gave no evidence on the floor of the cranial fossa of the underlying mischief.

The scale of sequestrum was not more than a centimeter wide.

PURULENT OTITIS MEDIA; ABSCESS IN THE CEREBELLUM; DEATH; AUTOPSY.

By J. H. WOODWARD, M.D., Burlington, Vermont,

PROFESSOR OF DISEASES OF THE EYE, EAR, AND THROAT IN THE UNIVERSITY OF VERMONT OPHTHALMIC SURGEON TO THE MARY FLETCHER AND THE FANNY ALLEN HOSPITALS.

J. D., thirteen years old, was brought to my clinic at the Mary Fletcher Hospital, in May, 1892, for treatment of a purulent discharge from his left ear and a large swelling in the region of the left mastoid. A quantity of pus was evacuated by a Wilde's incision, when, after it was ascertained by elevating the periosteum that a sufficiently large aperture existed in the outer table of the bone for satisfactory drainage, operative interference was discontinued. Within twenty-four hours the patient was moved to his home, and he was cared for afterward by his family physician, who reported to me subsequently that the boy had made a perfect recovery.

In July, 1893, I saw this patient for the second time. The left ear was discharging again. Behind the ear I found a discharging sinus, at the bottom of which I found uncovered and carious bone. An immediate operation was advised, but inasmuch as I was about to leave town for a prolonged absence I suggested that one of my colleagues be called in to perform the operation and take charge of the case. At the same time, the family physician was advised to open up the sinus and disinfect the parts as thoroughly as possible, if the patient's family should reject the more radical measures proposed.

On April 17, 1894, I saw the patient for the third time, when he was again brought to my clinic at the Mary Fletcher Hospital. I was informed at that time that the ear had recovered in the summer of 1893 under the supervision of the family physician who had acted according to my supplementary suggestions, but had not made the radical operation on the mastoid which had been

advised. Until early in April, 1894, the boy had been in good health, and his ear had not discharged. Then he began to suffer from severe pain in the left mastoid region and over the left side of the skull; and the ear had begun to discharge again. For several days, the pain had slowly subsided until when I saw him it had ceased to be a symptom in the case. A profuse dirty-yellow purulent discharge poured from the ear, but there was neither swelling nor tenderness in the mastoid region. The boy was able to walk about and on casual inspection he did not appear to be very sick. He was very anæmic, however, and his skin was slightly jaundiced. He said that he felt well. No disturbances in the motor or the sensory mechanism were found, though looked for. The ear was syringed with peroxide of hydrogen several times daily, and the patient was permitted to roam about the ward at will.

The patient's temperature in the morning of April 18th was 98½°. During the forenoon he had a severe chill, and his temperature rose to 103½° in the afternoon. On the 19th his morning temperature was 98½°; the evening temperature was 102½°. On the 20th, the morning temperature was 98½°; the evening temperature was 100½°. On the 21st, the morning temperature was 104°, when I operated upon his mastoid. During this period I had seen the patient daily, and had examined him with great care in the hope of discovering something that would indicate the site of the pus that manifestly was present somewhere in his head. But I did not detect one objective symptom referable to his nervous system. The subjective symptoms also were negative. He did not complain of any pain whatever. There was not the slightest evidence of inco-ordination, nor was there any paresis, tremor, or spasm, or any change in sensation anywhere. The boy was not very strong, but his weakness was general and in no sense specialized. Perhaps the mental state of the patient should be referred to. His mind was perfectly clear; he answered questions promptly and correctly. Still, there was a certain pertness and an indefinable peculiarity in his talk that seemed unnatural to others as it did to me. His character was by nature peculiar, and his life as a newsboy may have developed the strangeness that we noticed in his mode of thought and his method of expressing it.

In the forenoon of April 21st, I opened the mastoid cells on the affected side, but did not find pus. I did not trephine the skull.

In the evening of the 21st, the boy complained of very severe pain directly in the middle of his forehead. He suffered intensely from this pain, and a hypodermic injection of morphine was administered. I saw him in the morning of the 22d, and ordered that no more morphine be given. At this visit he still maintained that he was feeling well. His mind was clear. His ear was discharging less. His temperature was 99°. His pulse was irregular in rhythm and in force ; otherwise, his condition was apparently unchanged. In the evening, his temperature was 102½°, and he had another attack of severe pain in the middle of his forehead, which was not relieved by bromide, although it ceased after the foot of the bed had been elevated. On the 23d, the morning temperature was 99½° ; the evening temperature was 100½°. On the 24th, the morning temperature was 99½°.

About 4 P.M., April 24th, I saw him alive for the last time. The ear had ceased to discharge, and there had been no effort of repair in the wound behind the ear. The boy was irritable, and wished me to let him sleep. Nevertheless, he replied rationally to my questions. He was able to sit up in bed without assistance. I could not find any motor or sensory symptoms about him, although I made a careful examination. Also, I made a careful ophthalmoscopic examination at this time, and I found the media clear and the fundus normal in each eye. His pulse was still irregular in force and rhythm, and weaker than at any previous visit. During the evening he had more pain in the middle of his forehead, but it did not trouble him long. He was found dead in his bed about 3 A.M., April 25th.

The autopsy was made by Prof. H. C. Tinkham of the University of Vermont. It was found that a purulent pachymeningitis had invaded an area on the posterior surface of the petrous portion of the left temporal bone near the internal auditory foramen. The bone was carious in that region. It extended beneath the lateral sinus. No blood-clot was found in the sinus. Several small apertures through the wall of the sinus communicated with the purulent focus under the dura mater. Adjacent to the latter, the cortex of the left lateral lobe of the cerebellum was discolored, softened, and necrosed over a small area. The remainder of the cerebellar cortex had a perfectly normal appearance, and no adhesions of the dura or of the pia

mater were present on its surface. Incision into this lobe revealed the fact that *its entire interior had been converted into an abscess cavity*, which contained exceedingly foul-smelling pus. Critical examination showed that the white matter had been entirely destroyed, and that the abscess cavity was enclosed by an envelope of gray matter, the outer aspect of which was normal. The thinnest part of this envelope was not less than one-quarter of an inch in thickness. The remainder of the cerebellum was healthy. The lateral ventricles contained an excess of clear serum. One very small fibrous nodule was discovered in the pia mater about one inch to the left of the longitudinal sinus opposite the extremity of the fissure of Rolando. Otherwise the cerebrum was normal in appearance.

It is perfectly evident that no operative interference could have saved this patient at any time subsequent to April 17th, when he was brought to me for the third time. But the probable duration of an abscess in his cerebellum of sufficient dimensions to destroy the function of an entire lobe is a subject for curious speculation.

ON THE DISTURBANCES OF EQUILIBRIUM IN DISEASES OF THE EAR.

By Dr. STANISLAUS VON STEIN of St. Petersburg.

Translated, in abridged form, by Dr. J. A. Spalding, Portland, Me.

ACCORDING to Goltz and Mach Breuer [1] the labyrinth contains a special anatomical apparatus or organs of sense which by reflex action serve to maintain our equilibrium during motion (the canals—dynamic organs of sense), and during rest (utriculus and sacculus—static organs of sense). Many experiments go to prove the accuracy of this hypothesis, so that in our days it has been elevated into a theory.

Ménière was the first to bring clinical proof that disturbances of equilibrium may be due to diseases of the labyrinth. Since then many observers have utilized deaf-mutes, in whom, depending on ill-defined lesions of the labyrinth, disturbances of equilibrium, with simultaneous inability to move about with closed eyes, as well as the absence of nystagmus on passing galvanic currents obliquely through the head, have been observed. The idea next arose to study these conditions not only in deaf-mutes in whom the local condition had become mostly stationary, but in active diseases of the middle ear, and of the cochlear branch of the VIII. pair, and then from the mutual relations of the symptoms to obtain suggestions for prognosis and therapeutics. Another task will be to discover the differences between the

[1] All accessible literature on the topic can be found in my treatise on the functions of the various portions of the labyrinth, published by Fischer of Jena in 1894.

disturbances of equilibrium due to ear diseases and those dependent on affections of the nervous system. The present paper will discuss such disturbances due to ear diseases as were studied during the past three years, whilst pure cerebral and spinal-cord affections will be excluded for the sake of simplicity.[1]

Flourens and Ewald experimented only with birds, Boettcher with animals, and Guye[2] has pointed out disturbances of co-ordination of the right hand as a result of aural disease.

In continuing these experiments on man I have divided my material into two groups; first, the results of the tests for hearing; and, second, of the muscular energy of the lower and partially of the upper extremities with the eyes open and closed. The second group is subdivided into static and dynamic energy. The static energy was more closely examined in the following positions, with the legs close together, standing on the toes, standing on the right or left leg, and standing on an oblique plane. The dynamic energy was tested by walking forward and backward on a level, jumping forward and backward on the toes with the legs closed, hopping on the right or left leg alone forward or backward, turning on the vertical axis of the body with closed legs to the right or left, and finally turning about on one leg alone.

STATIC MUSCULAR ENERGY.

(1) *Standing with the Legs Approached and with Knees Stiff.*

The lower extremities having been approached until the inner edges of the feet touch each other, the patient is placed on a level floor with the eyes directed straight ahead, as the slightest inclination will often suffice to excite disturbances of equilibrium. Then the eyes are closed,

[1] We have abundant examples of disturbances of equilibrium after irritation of the terminals of the VIII. pair from increased pressure in the labyrinth, as by syringing, inflation, compression of air in the meatus, impaction or cerumen, or by the action of tones, or chemical or thermal irritants. (For literary references, compare Schwartze's text-book, and H. Knapp, "Clinical Analysis of the Inflammatory Affections of the Inner Ear," *Arch. f. Aug. and Ohrh.*, II. 1, p. 268. These ARCHIVES, II. 1, p. 204.

[2] "On Ménière's Disease," These ARCHIVES, ix., p. 230. The handwriting in this case is depicted during and after the disease.

or they may be lightly bandaged. It is best in the beginning to close the eyes, and not to cover them, because if the latter is done the movements are too marked, and the patients often fall on the floor unless some one is on hand to prevent.

The arms hang by the side, but may be voluntarily raised on losing the equilibrium.

A healthy person will stand for minute after minute with eyes closed or open without swaying noticeably. A few persons with ears diseased act also normally, but the majority exhibit disturbances. With open eyes they stand erect, but the moment the eyes are closed they begin to sway, or to incline the body to one side or the other, and finally, according to the extent of the disease, to lose their equilibrium. These disturbances may be thus arranged:

(*a*) Direct swaying forward and back till they fall forward or backward.

(*b*) A frequent diagonal sway, in which case the body generally rests on one foot.

And (*c*) a conical vibration, if we may so express it, in which the body vibrates like a ninepin with its base upward. This is rare.

(2) *Standing Partly on the Toes and Partly on the Soles of the Feet, with the Legs Close Together.*

In this position the disturbances are more noticeable. A healthy person easily takes and continues the position on the toes with eyes open or shut, occasionally making slight compensatory vertical movements, sinking and rising.

Some ear patients act like the healthy, others act normally with eyes open, but when the eyes are closed an instantaneous trembling and balancing is excited and lasts until the patient falls to his heels. In testing, we can give the patient a certain position and then make him close his eyes, or first close the eyes and ask him to take a given position. In the first way, we get falling forward (very often) or backward (rarely), or diagonal, falling front and right, or left, or backward to right and left respectively.

If, however, the person stands a brief time with eyes closed and legs together, and is then asked to stand on the toes, we see:

(*a*) He cannot with the greatest exertion lift his heels from the floor. They are apparently glued. But if the eyes are opened the motion is at once accomplished.

(*b*) Or the heels are lifted from the floor, but the patient sinks back, or bends his body backward, or, in order to avoid a fall, he involuntarily makes one or two steps backward.

(*c*) Or sometimes he can maintain the toe position for a few seconds, only to fall as above mentioned.

(3) *Standing on One Right or One Left Foot.*

Healthy persons with eyes open or closed can stand on one foot for about half a minute provided that from time to time they balance with their hands, and the other lifted leg, and move a trifle from a fixed spot. This test can be facilitated by resting the raised leg on the opposite foot (best for ladies), or by bending it at the knee and resting it against the side of the other leg. If the raised leg is held free in the air equilibrium is with difficulty maintained.

Experiments on pigeons showed that they could stand for a long time on one leg on the uninjured side. The other leg is always weakened.

Clinical observations show that some ear patients may act differently from healthy people.

In the first series of observations, the patients stood on one leg with the eyes open, and then shut, when these motions were witnessed, in the case of the right leg:

(*a*) Laterally to the right, or (*b*) laterally to the left.

(*c*) Diagonally to the right and forward or back (rarely).

(*d*) Diagonally to the left and forward or back (rarely).

In standing on the left leg the same movements are seen. But if the patient stands with closed legs and closed eyes, and is asked to lift the left leg, we see, (*a*) after standing awhile he falls as before mentioned; (*b*) or the moment he has lifted the right leg he lets it fall again, and repeats this just so long as he tries to stand on one leg alone. He also complains of rapid weariness.

The connection between an ear disease and the various directions of motion may be thus exemplified:

(*a*) *Disease of Right Ear.*—The patient stands firm on the right leg alone, but falls to the right when trying to stand on the left leg alone.

(*b*) *Disease of Right Ear.*—Stands firm on left leg alone, but standing on right leg alone falls to the left.

(*c*) *Disease of Right Ear.*—Falls to left from right leg alone and to the right from left leg alone. Crossed disturbance of co-ordination.

(*d*) *Disease of Right or Left Ear.*—Falling in opposite direction (rarely).

(*e*) *Bilateral Disease of the Ear.*—As in the first three.

These clinical facts justify this conclusion: Each labyrinth regulates the static muscular energy of the lower extremities simultaneously on the same and on the opposite side. Take case (*a*). The healthy portion of a region of the right labyrinth sends normal impulses to the right lower extremity, which simultaneously receives the same impulse through the crossed tracts from the left labyrinth. The right leg stands fixed. Standing on the left leg, the left labyrinth sends normal impulses to the left leg, but the right labyrinth does not. The results of the weakened impulse, or omission of impulse, pulls the patient to the right.

These patients do not generally suffer from vertigo. When asked why they do not maintain any assumed position, they reply that they are impelled by an irresistible force.

(4) *Standing on a Descending Plane, with Closed Legs and Stiff Knees.*

In order to express in fractions the intensity of disturbances of equilibrium in certain directions, I have had constructed a static goniometer or angle-measurer. It consists of two boards, the lower of which, 85 *cm* long, lies horizontally on the floor, whilst the upper one, 1.4 *m* long, can be moved about an axis of 50°. This upper board is furnished at one end with a toe supporter, 2 *cm* in height, and against this the end of the foot is rested in experiments. The board is raised by two strong parallel chains, which run around a roller

and handle, provided with a clapper to prevent slipping. The entire iron structure, 1.86 *m* high, can be smoothly pulled out and in through the grating on the lower board. The right side of the apparatus has a graduated arc for measuring the degrees of ascent of the upper board. The entire breadth of the apparatus is 25 *cm.*

BEHAVIOR OF HEALTHY PEOPLE ON THE GONIOMETER.

The patient stands erect on the upper board, with closed legs, stiff knees, hands hanging down, and the tips of the toes against the supporting board. On rapidly turning the wheel and axle, a healthy person with eyes closed or shut can be lifted into the air on an incline up to a certain amount before he begins to totter, but from that degree onward he inclines more and more to fall forward into space. The maximal angle of inclination averages from 36° to 40°.

In approaching the critical point we must turn the wheel slowly because the patient, in order to maintain his equilibrium with eyes closed or open, stands on his toes, and thus raises the soles of his feet from the board.

In order to avoid any anxiety or danger from a fall, the apparatus may be placed before a wall against which the patient can hold out his hands as he tends to fall. And it is also useful for accuracy to have an assistant at hand of whose presence the tested person will be made aware before his eyes are closed. Farther accuracy is obtained by testing with the eyes both open and closed. Additionally, the heels ought not to be more than 1 or 2 *cm* high, and without inside soles. I have also had constructed an apparatus for strapping on the backs of the tested persons, and thus holding them erect on the goniometer. And as this proved too cumbersome, on account of the many straps, I devised another apparatus. It is a rod 2 *m* in height with a circle above, from which is suspended down the centre of the rod a weight with a fine thread for a perpendicular mark. This is fastened to the body in the manner depicted, and serves to hold it erect, the head being erect also and the eyes directed forward.

Particular attention should be paid to maintenance of the head in its position, as its movements forward or backward have an influence on the early or late manifestation of the various disturbances of equilibrium. The latest models for this attachment are provided with two supports for the head as in a photograph rest.

Inclination posteriorly as well as laterally can be measured on the goniometer; in the first direction by placing the heels against the rest, and laterally by placing the outer edge of either foot against the same. Posterior inclination varies from 26° to 30°, and lateral from 37° to 38°.

In patients with ear diseases I do not lay much stress on one or two degrees of variation from the normal, because my observations are not yet so accurate as to measure such slight variations. I would also mention that Gradenigo has lately made similar observations on the deaf, and that his measurements agree substantially with mine.

HOW NOW DO PATIENTS WITH AURAL DISEASES ACT UPON THE GONIOMETER?

Here we observe three groups,—the first acting normally with eyes open or closed. These are cases of simple affection of the auditory branch of the eighth pair. The second act normally with eyes open, but show static disturbances with eyes closed. The third exhibit slight static disturbances with eyes open, and emphatic disturbances with eyes closed.

Loss of equilibrium is mostly shown whilst slowly turning the wheel; the patients do not rise evenly, but by starts, forward or backward, and if turning is not at once stopped, the patient falls without having reached his maximum. This shows that the impulse of co-ordination has not reached the muscles with sufficient rapidity, and that the patient at every elevation of the board is put into the same condition as a normal person as he approaches the critical angle. Some patients who fall at their maximal angle when their eyes are closed can still stand if their eyes are open. On closing the eyes again, he can be lifted a trifle higher, or he falls at the slightest elevation.

When I see that a case is a bad one, I do not test so accurately with the body holder, on account of the risk of falling. This may also be obviated by telling the patient at once to open his eyes. Ear patients tire rapidly, and in severe cases the tests should be brief. These patients often behave normally in standing and walking, but exhibit disturbances on the static measurer, which is, therefore, a sensitive demonstrator of co-ordination disturbances. Anæmic people fall at a small angle of inclination.

DYNAMIC MUSCULAR ENERGY.

(1) *Walking Straight Ahead on a Level Floor, Forward or Backward.*

It is easy for a normal person to walk with an even tread on a level floor with eyes open or shut, straight ahead or backward, the steps being equal in length, and the toes pointed outward. They walk faster forward than back. Some from dread of falling stretch out their hands, and shorten their steps. To encourage a rapid walk, the examiner places himself at the opposite end of the room. The walk should be rapid, as disturbances of equilibrium are observed only under certain degrees of rapidity. It is a good plan for the physician and his assistant to walk by the side of the patient to encourage him to do his best, and to assure him of assistance in case of a fall.

The walking test can be varied by making the patient step up over a coffin-shaped plane, like this /‾‾‾‾‾\, upon which a healthy person can walk without stumbling, whilst the affected stumble easily.

OBSERVATIONS MADE IN EAR PATIENTS.

James, in 1882, observed that deaf-mutes spread their legs apart and shuffle as they walk. Teachers in deaf-mute institutes have long observed that the pupils shuffle as they go, rarely lifting the feet from the ground. And. Kreidl, in 1884, observed that with closed eyes they could not stand on one leg. Experiments on birds, after lesions of the canals, show weakness in the extremities, and from study of

these we get hints for the possible localization of certain disturbances in man.

The following conditions are seen in aural affections:

(1) Normal walking eyes open or shut.

(2) With the eyes closed, going forward or backward, a labyrinthine waddling, caused by protrusion of the legs and shuffling of the feet.

(3) On walking with eyes shut, a labyrinthine zig-zag to the right and to the left.

(4) In going forward with eyes shut, a deviation to the right or left; and finally

(5) On walking backward with closed eyes, a deviation to right or left.

(In many cases under four and five the patients go roundabout to avoid loss of equipoise, one leg making a larger curve than the other.)

(6) Occasionally it is impossible for the patients to move either forward or backward with closed eyes, in their dread of falling.

(2) *Observations whilst Jumping.*

A healthy person can jump to and fro or roundabout with eyes open or shut, varying the distance at will and for several minutes without much exertion. But it is different with the deaf:

(1) Who can jump with eyes open, but soon tire; the space covered is not normal and the knees bend excessively.

(2) When the eyes are closed the jumps are noisier and irregular, the weariness comes on rapidly, and after making two or three long jumps the patient makes short ones.

(3) The same is observed in jumping backward.

(4) On jumping forward or back, a deviation to the right or left; and lastly

(5) The patient cannot make a jump with closed eyes, but falls to the ground.

(3) *Hopping on One Leg.*

Healthy people can hop two metres, for instance, with eyes open or closed, and straight ahead, the tips of the toes being turned out.

Patients with ear disease act thus:

(1) Like a normal person, but rapidly tiring.

(2) When it occurs that the patient can still stand on one foot, we see one, two, or three long hops, with prolonged pauses, as if the patient were thinking that he ought to make up his mind to hop. Then we see small hops, zig-zag mostly, and occasionally up and down on the same spot. At last weariness becomes extreme and the patient drops into a seat, but not until he has lowered his body by bending the knees toward the floor.

These hops are so characteristic that I call them labyrinthine hops.

During this movement deviation to one side or the other is often noticed, the toes turn inward, the patient balances himself with his outstretched arms, and occasionally sinks so low that his hands touch the floor.

(3) Where the patient cannot stand with closed eyes on one foot, a hop is almost impossible, as the other foot instantly falls to the floor.

On hopping backward similar movements as under (1), (2), and (3) are observed.

(4) *Rotation on the Vertical Axis of the Body to the Right or Left with Legs Close Together.*

This is done easily by the healthy, the person tested raising himself on his toes, and then turns the body on its axis, right or left, several times in succession with eyes open or closed. But if deaf, he either:

(1) Acts normally, or

(2) Makes a complete circle, but all his movements are very slow, and he rapidly tires; or

(3) He leaves his position and spreads his legs.

(5) *Rotation on One Leg.*

This is the most difficult motion, a normal person learning it easily, a deaf person barely. It is thus performed: The heel is lifted from the floor and the body turned slowly about the leg. Then the heel is again rested on the floor (to save one's balance), then the patient rises on his toes

again, and so on over again till he has completed a circle without leaving the original spot. To many it is easier to turn by hopping on one leg. The movement is made in four directions: for the right leg, to the right and behind, to the left and forward; and for the left leg, to the left and behind, and to the right and forward, all of which can be done by people in health.

Ear patients, with closed eyes, behave:

(1) Normally, very rarely.

(2) They cannot rotate at all.

(3) They rotate with the greatest exertion and move about from spot to spot.

(4) They jump to and fro or sideways, lose their balance, and then set the other foot on the floor.

(5) Every attempt to turn or jump ends in a fall. Occasionally they fall in the opposite direction from the attempted rotation, but generally in the same line.

The above suggested disturbances may appear singly or in groups. Those cases in which they occur only in a certain direction are to be regarded as simple, in contradistinction to the complicated cases with several directions of falling. The simple cases offer us purely clinical proof of an exact localization of the peripheral elements. The disturbances of equilibrium can also be combined with aural disturbances of different degrees, so that we get a complicated clinical picture. We may even be compelled to assume in time a complex of symptoms for each branch of the VIII. pair, the cochlear, the saccular, the utricular, and the ampullar.

Still in the absence of exact scientific methods of investigation we must for the present be satisfied with determining the manifold disturbances, and take refuge in a less exact grouping of the still scanty clinical material at our command.

The first group, for the cochlear branch, will contain all cases of lessened hearing without disturbances of equilibrium. The second, for the saccular branch, those with simple or complicated disturbances of varying intensity with simultaneous loss of hearing. I have never seen but one case of

this sort, and they are difficult to determine, because similar disturbances might be due to hysteria, anæmia, or to a central disease.

The third group, the utricular, comprises all cases with loss of hearing and simultaneous disturbances of equilibrium, as seen in most of the cases occurring in practice.

Disturbances of equilibrium are often observed in acute and chronic middle-ear diseases, but rarely in diseases of the outer ear. In labyrinthine disease, they are more permanent. Inflammatory processes of the meatus and middle ear produce but transitory disturbances which disappear with convalescence. Their intensity in middle-ear diseases varies, and they are generally produced by increased labyrinthine pressure, hyperæmia, and inflammation, by all three alone or combined, and the frequency of the same remains still to be determined.

May not all these symptoms be due to ataxia?

Not at all, when we reflect that genuine ataxia is a condition in which a patient who is not paralyzed can no longer perform movements *or can only perform in an ungainly fashion movements which he once could perform with absolute precision.* Nor can the vacillations in standing be due to anæsthesia but to something else and that is weakening, or total loss of tonic impulses for the muscles from the labyrinth. This results in an alteration of muscular action, which is to be divided into coarse and fine. The former are more or less under voluntary control or the control of the eyesight. The latter are observed on closing the eyes, and are, in my opinion, dependent on an automatic apparatus situated in the labyrinth, which from there regulates the finer muscular contractions as in rope-walking, and so on. Perhaps the so-called muscular sense is nothing more than the unconscious sensations which are constantly running from the labyrinth to the muscles.

The disturbances of co-ordination in ear diseases may occur:

(1) With the eyes closed (in the absence of ataxia and alterations of sensibility).

(2) With the eyes open, the rapid movements never attain

their normal correctness and promptitude, but are often doubtful and slow.

(3) They may be only observed in certain situations and directions.

(4) They are not always equally divided between the two lower extremities; the patient, for example, can stand on the right leg, but not on the left.

(5) There is polymorphia in the disturbances.

(6) Easy weariness especially with closed eyes.

This may be due to altered muscular energy. The patients have to think, before completing a movement.

(7) A smaller angle of inclination on the goniometer.

(8) With simultaneous diminution of hearing, or another disease of the ear.

(9) Tinnitus or loss of hearing.

(10) With some nasal disease, as adenoids, hypertrophic rhinitis.

(11) Attacks of vertigo (with exclusion of nervous and ocular disease). Visual vertigo differs from aural in that the former disappears on closing the eyes, and the patient walks naturally.

(12) The patient on falling retains his consciousness.

But, after all, we shall often meet with patients in whom the various symptoms are so entangled together, that we cannot precisely localize, and much time may be needed to determine the exact state of affairs.

SUBJECTIVE SENSATIONS.

Most of my patients suffered from disturbances of co-ordination, without a trace of vertigo.

In explaining their sensations they say that they are compelled by an irresistible force to act as they do, whilst others merely lose their idea of space in certain directions, and then involuntarily make compensatory motions to prevent falling.

Parallelism between subjective sensations of sound and loss of equilibrium cannot always be fixed. But often, very loud noises are accompanied with disturbances. Noises

without loss of hearing but with loss of co-ordination indicate a labyrinthine disease. Thus we may diagnosticate:

With loss of hearing by A. C., but good B. C., no disturbances: an affection of the conducting apparatus.

With loss of hearing, good A. C., good B. C., tinnitus, and no disturbance: affection of the conducting apparatus and ramus acusticus.

With loss of hearing for A. C., good B. C., no tinnitus, but disturbances of co-ordination: affection of the conducting apparatus and static-dynamic branches, due to increased labyrinthine pressure, hyperæmia or inflammation. If catheterization improves the hearing, the conducting apparatus is affected.

With loss of hearing for A. C. but preservation of B. C., with tinnitus and disturbances of co-ordination: affection of sound-conducting apparatus.

With A. C. and B. C. good, tinnitus, and co-ordination disturbances: affection of acoustic and static-dynamic branches. With good A. C. and B. C., and disturbances of equilibrium, it is difficult to decide. If disturbances are better after Politzeration, we suspect labyrinthine disease. This diagnosis is more probable, if after instillation of cocaine into meatus, or insufflation of cocainized vapors, the disturbances increase.

LOCALIZATION OF THE DISEASE.

Static disturbances suggest affections of the utriculus and sacculus; dynamic (with nystagmus), disease of the ampullar system.

The symptoms of labyrinthine disease, such as tinnitus, deafness, vertigo, uncertain steps, nausea, vomiting, and occasional fainting, can combine in many ways; such as tinnitus alone, deafness alone, tinnitus with deafness, vertigo with disturbances of equilibrium, sudden falling to the ground with vertigo, disturbances of equilibrium, Ménière's complex of symptoms, and two new symptoms not hitherto mentioned, namely, tinnitus with disturbances of equilibrium in certain directions with or without loss of hearing, without vertigo or nausea, and finally momentary precipitation to

the ground when the eyes are closed, associated with tinnitus and more or less deafness, but without vertigo, nausea, or loss of sensibility in the skin, or of consciousness.

From a prognostic point of view, the more marked, permanent, or manifold the disturbances of equilibrium in a peripheral disease of the ears, with simultaneous loss of hearing, the less hope there is of any restoration of hearing.

Many deaf people complain of being hurled to one side whilst walking, but without loss or with but the faintest loss of consciousness. Many such attacks are referred to petit mal, or epilepsy. So too where an aural affection has never been diagnosticated, many slight symptoms are referred to incipient ataxia, such as inco-ordination, on arising from a chair, whilst standing on one foot, on suddenly standing still after walking, on going down stairs, but they can all be explained by an affection of the labyrinth.

Theoretically, the otoliths are structures which obey no impulses but that of gravity, and which exercise a constant and uniform irritation upon the terminal branches of the utriculus and sacculus. In inflammatory affections we can imagine that the otolithic plates exercise a much more intense effect upon the irritated organs, or are partially dissolved and float about in the endolymph. If we move rapidly, or come quickly to a stop, the otoliths will not exercise the usual uniform impulse upon the muscles by whose synergic or antergic contractions the co-ordination of movements is produced, so that in time we get a new disease entitled *asynergia musculorum labyrinthica*, with its utricular and saccular subdivisions.

Let me now call brief attention to some typical cases:

CASE 1.—Dr. H., aged thirty-three, suffered from scarlatina in youth but without troubling the ears, until when seventeen his left ear failed and continued to grow worse despite treatment. The pharyngeal affection was also treated, and the nasal douche tried. Tinnitus gradually appeared in this ear. The right ear remained good until three years ago, when catarrh ensued, and, not long after, the hearing of both ears became poor. No syphilis, no heredity. Ever since childhood he has felt dizzy on high places.

Examination shows *Mtt* gray and retracted ; improved hearing after the catheter. Right ear : whisper 11 *m.*, Politzer's audiometer 8 *m.*, and A. C. for tones good.

Left ear : violent tinnitus, causing melancholia at times. Whispered voice, at meatus ; audiometer, on contact ; vibrations from 36 to 20,480 Koenig ; Galton, 3.6 ; Weber, left, and Rinné up to 512 ; B. C. good for all tones up to 1024.

Static tests with feet together and eyes open, normal ; with eyes closed, gentle swaying of body to right, then to left, occasionally forwards.

Standing on the toes with eyes open, normal ; with eyes closed, an invincible inclination forwards ; he exerts all his strength to maintain his equilibrium, bending his knees, and his body excessively back, and then standing on the tips of his toes, but, despite it all, he is suddenly hurled forward.

On right foot alone, normal with eyes open ; with eyes closed, he moves diagonally to the right and forward. On left foot, he stands normal with eyes open, but with eyes closed inclines to the left, and after great efforts to maintain his equilibrium, falls backward to the right.

The goniometer shows an anterior inclination of 30° with eyes open, but only 12° with eyes shut ; posterior inclination of 30° eyes open or closed, and lateral inclination of 37° with eyes open, but with eyes closed and the right foot turned to the supporter he falls diagonally to the right at 14°, and straight to the left at an angle of 9° when the left foot is placed next to the supporter.

Dynamic tests : Walking forward, with the eyes open, straightforward ; with eyes closed the gait is normal but the legs are spread apart. Walking backward is normal with eyes open ; closed, he deviates to the left.

Jumping with both feet is normal with eyes open or closed. Hopping on the right foot is normal with eyes open ; with eyes closed he curves to the left, and on attempting to hop backward he fell forward violently to the floor, and lay there like a lifeless body, but when the bandage was taken from his eyes he lifted himself from the floor. He complained of excessive weariness during the tests. It seemed to him, as he fell, that it resembled a fall in a dream, but there was no vertigo.

The tinnitus was successfully treated with cocain-vapor, and the hearing simultaneously increased, but the co-ordination disturbances at the last account had remained the same.

CASE 2.—Aged nineteen; previous attacks of rheumatism; gradually deaf in both ears; suffers greatly from tinnitus. Contra C fork is perceived as a rumbling, but no other can be heard.

With eyes open the tests are normal, and so too when on both feet with eyes open or closed, but on closing eyes whilst standing on one foot he falls to the left from the right foot, and to the right from the left foot. *This is then a case of crossed disturbances of equilibrium.*

CASE 3.—A lady of twenty-one suffering five years from progressive loss of hearing, despite pilocarpine injections and other remedies. Bone conduction good, but A. C. bad; high tones perceived. With the eyes open static and dynamic tests are normal, except in standing on the right leg the patient is pulled to the left. On closing the eyes and standing on both feet she falls forward; standing on the left foot, she falls to the left, and the same from the right foot.

Here we observe with excessive deafness *a slightly marked disturbance in the direction of the worse ear.*

CASE 4 offers nothing of interest except that with loss of hearing in both ears the patient falls in the direction of the worse ear when standing on both legs.

CASE 5 is a man of thirty-two suffering from what appears to be syphilitic deafness, though there are symptoms of ordinary ot. med. cat. chr. in both ears. With eyes open he stands and walks normally, but on closing the eyes he falls generally to the left either from both feet or from either one alone, which is in the direction of the worse ear. After treatment with cocain-resorcin instillations the noise in the right ear increased and the hearing deteriorated. Gradually, however, the hearing in the right ear improved, but repeated tests showed a constant tendency to fall to the right, which was finally *the better ear of the two.*

CASE 6.—A locomotive engineer, of thirty, has gradually lost his hearing in both ears. Syphilis suspected. Constant tinnitus, but *Mtt* normal and tubes open. Hearing in the right ear is: whispered voice at 30 *cm*, audiometer 56 *cm*; forks, with difficulty, Galton 2.5, and Koenig 24,576. Left ear: loud voice on contact; Galton 3 and Koenig 20,480. Bone conduction for Weber gives a "trembling" sensation, whilst Rinné is positive in the left ear.

The static tests are normal with eyes open, but closed, a slight swinging motion of the whole body. The dynamic tests, on the

contrary, show *slow* walking possible with the eyes open, but when they are closed the patient turns partly about on one foot, and from time to time, when standing on the left leg, the right is let fall to maintain a balance.

CASE 7.—A very intelligent woman began to lose her hearing soon after the birth of her first child, and after each successive childbirth the hearing has invariably decreased. She suffers from tinnitus when tired. She can barely hear a loud voice close to the right ear, not at all with the left. All forks barely perceptible. Galton, 6 in the right and 4 in the left ear. Rinné negative, and Koenig 10,000 right and 8000 left. B. C. good in the right for all tones, but only high tones in the left.

On closing her eyes she falls backward, is obliged to exert great force to rise from the floor, and then falls backward so that she has to be caught. When walking she wavers, now to the left and then to the right. Treatment useless.

CASE 8.—Concussion from a bullet in the right ear in 1877, followed by tinnitus, later by headache and repeated attacks of vertigo, so that oftentimes he had to remain in bed. During an attack everything falls in upon him, but he never has lost consciousness. In 1880 he became deaf in the injured ear. Up to 1891 the symptoms remained the same, but then new symptoms appeared, especially a sort of *shock* in the head, so that the face became pale, the eyes red, and he could with difficulty maintain an upright position. After the influenza in 1892 he was repeatedly affected in this way, momentarily falling to the ground, but without losing his consciousness, and always able to stand again unaided. When forewarned he could momentarily prevent an impending fall by supporting himself against some neighboring object, but ultimately no matter how strongly he resisted he would be hurled to the earth. Occasionally this occurred when sitting in a chair. The tongue was never bitten, no foaming at the mouth, and no convulsions. He simply felt exceedingly tired. Late in September, 1892, he struck his face against a table in one of these attacks. He leads a regular life, neither drinks nor smokes, and has no signs of syphilis.

Treatment of the nervous system useless.

1893.—The right ear cannot distinguish loud voice or whispered voice on contact, nor the audiometer, nor anything by bone conduction. Koenig 16,384, and Rinné negative. The left ear hears loud voice well, low voice at 1 M ; audiometer, same dis-

tance ; Galton 2, Koenig 24,576, B. C. good for all tones, and Rinné positive.

With eyes open, the static tests are normal, except a slight wavering on the toe tips. Inclination on the goniometer 22°.

On closing the eyes, he falls forward and to the right from the toe tips, and to the right from either foot alone.

Goniometer 14° with eyes closed.

Dynamic tests : With open eyes he can walk directly forward or backward, or rotate on one or both feet, but when his eyes are closed he turns to the right in walking forward ; can walk straight backward, but on rotating on the right foot, hops to the right, and balances with hands and body, and on rotating to the left deviates farther to the left ; finally, in rotating on the left foot he falls to the right when turning to the right, and to the right in rotating to the left.

Instillation of cocain-resorcin into the right ear twice daily ; result, head aches less, no repetition of the falling to the ground, and the tinnitus was scarcely noticeable. Noticeable increase of hearing in the left ear after catheterism, which before had been of no use. Thus improved, the patient was discharged in November, obliged only from time to time to renew the instillation of cocain-resorcin to prevent the old attacks.

Case 9.—A lady of thirty came under my care in 1884 with tinnitus and permanent headache, following soon after a silver cauterization of the naso-pharynx. The first symptom was profuse double otorrhœa. This ceased, and the hearing remained intact, but the tinnitus persisted. Many remedies were employed —for instance, arsenic, silver, antipyrin, antifebrin, phenacetin, cocain, blisters, galvanization, faradization, and so on, most relief being obtained from arsenic. The electric light relieved the pressure in the ears and the tinnitus. Pilocarpin caused œdema of the auricles. Saline irrigations of the nasal passages were useless ; catheterization increased the tinnitus. Politzeration was useful at first, but not later. In summer the symptoms were lessened, but of late there has been no change between one season of the year and another. The rhinitis was relieved, but deafness and tinnitus have gradually increased. For the last six years the patient has suffered intensely from headache, and has been obliged to sleep in a reclining position, for the moment she lies at full length, a terrible pain, with tinnitus, is excited, and she feels as if she were being hurled over a precipice. In spite of

this torture she sews fifteen hours a day. During her youth she suffered from somnambulism. She has had occasional otorrhœa during the past ten years.

Present condition : Anæmic, cannot move rapidly, does not stumble, except when moving rapidly, as, for instance, to avoid a carriage approaching, or to step from the sidewalk to the crossway. After dusk she keeps close alongside the houses, and avoids crossing the streets. She can climb steps easier than go down them, and in the latter act is obliged to hold fast to the banisters.

The upper extremities are normal, handwriting clear, and she sews beautifully.

The mucosa of the nostrils is hyperæsthetic, and the sensibility not deadened by cocain, so that catheterization is difficult. After performing it, the hearing is decreased.

She suffers from tinnitus, which increases on lying down, whilst at the same time the hearing grows worse and severe pain is perceived in the ears. When sitting erect, no nausea or palpitation of the heart, but both on lying down.

Static tests with eyes open ; slight tilting in no particular direction ; with eyes closed, in all the tests a rapid falling to the left mostly, occasionally to the right.

Dynamic tests : She can walk correctly with eyes open, but zigzag with them closed ; she cannot jump with both feet but falls to the floor like a dead body; standing on both feet she cannot turn round with her eyes open but stands as if glued to the floor. If she is supported in the least, even by the little finger of her physician, she can turn easily. On closing her eyes, with or without support, she instantaneously begins to totter.

Low voice at from 1 to 3 *m* ; the andiometer from ½ to 4 *m* ; Galton's whistles faint and all forks on the vertex, but not in the ear. Some forks produce a painful sensation by A. C., but generally there is no perception beyond a low, booming, or trembling sound, as she expresses it. Forks corresponding to about the pitch of the tinnitus are more painful than those above or below. Hyperakusis between 640 and Koenig of 8192 ; beyond the latter, none. So, too, Galton of 10,000 vibrations (3.6), is very painful.

Rinné's test is positive in the right ear. There is an occasional secondary resonance.

Static tests a month later with eyes open were normal ; with eyes closed and on both feet together, she falls backward. If she

closes her eyes, but then suddenly opens them and separates her feet, she can remain erect. There is no vertigo, but the same irresistible force as in other patients. *The floor flies out from under her feet.* If she is placed on the floor with her eyes closed she can get no higher than to her knees without support. From the toes she falls backward and to the right, with eyes closed. Open, she can stand still a second, then falls. From one foot, with her eye open, she falls to the right; and with eyes closed, to the right and backward.

Dynamically: she walks forward and back well, but with eyes closed she falls back to the left before taking a step. With her eyes open and both feet together she cannot jump, for the moment that she makes the movement she falls to the left. With the best of intentions she cannot maintain her equilibrium. Neither can she move to make a jump with her eyes closed. On attempting rotation she falls with her eyes open, making a quarter turn, and then falling to the left. With her eyes closed she cannot turn in the slightest degree.

The probable diagnosis is a partial affection of the acoustic branch of the VIII. pair, based on the fact that she cannot maintain the upright position with her eyes closed; moreover, an affection of the saccular branch.

CASE 10.—Miss ——, æt. eighteen; loss of hearing in the right ear after typhoid fever, and two years later in the left ear, but has never suffered from tinnitus. Within the last few months she has felt dizzy in the dark, and has been obliged to hold to something to prevent falling. Even as a child, was unable to move rapidly without a sensation of faintness. Has rhinitis hypertrophica. The drumheads are retracted. She barely hears low voice on contact, and deviates to the right in walking with eyes closed.

The patient was treated with instillations of cocain-resorcin, and cauterization of the turbinates with the galvano-cautery.

Hyperakusis for small forks up to 2048, which are then no longer heard. Low forks are painful. Koenig's rods are not perceived in the right ear, which is the worse ear. Left ear hears voice at 4 M and whisper at 1 *cm*; there is less hyperakusis than in the right, and high forks are slightly painful. Galton's whistle not heard in the right ear.

Audiometer on contact with the right ear, and at 1 M with the left ear.

With eyes open the patient falls forward from the toes, but on closing the eyes, on the right foot she wavers to the left and then back and forth ; on the left foot she stands firm. With eyes closed she stands firm on both feet : cannot stand on her toes ; from either foot alone, falls in the same direction.

Dynamic tests show deviation to the right in walking, and an unavoidable dragging forward from the right foot alone, till finally the left foot falls to the ground for support. All of the rotation tests are imperfect, and accompanied with a sensation of falling.

Treatment of cocain vapor was carried on for some time. A year later some improvement in the hearing in each ear. On closing the right ear a loud roaring was perceived in the left ear. Forks still painful to the right ear. Koenig rods still inaudible in the right ear. The static and dynamic tests remained about the same, except more noticeable inclination to fall on closing the eyes. Walking with eyes open or closed was uncertain. The jumping and hopping tests showed an inclination to fall backwards, and the rotatary tests a tendency to the right (or left) and backward.

Case 11.—A girl of thirteen became deaf in the right ear after a right-sided parotitis. No vertigo. The toe-tests showed an inclination to fall forward ; the one-leg tests, to fall to the same side ; and the dynamic tests, a deviation to the right.

All efforts to restore the hearing were futile.

Case 12.—A boy of eleven with double parotitis and loss of hearing in the right ear, with high temperature, and pain in the ear. Repeated attacks of vertigo. On the fifth day I saw the patient with temperature 39° (102° F.) ; drumheads normal. On arising from the bed he had attacks of dizziness. All objects seem to move from the left to the right. He cannot stand steady with both feet together and eyes open. On closing his eyes he falls back to the right. Standing with eyes open on either foot alone, he becomes pale, and falls backward. Phenacetin and instillations of cocain.

Case 13.—A lawyer of thirty-two ; progressive loss of hearing, right side, for some years. Three years ago, without apparent cause, sudden loss of hearing in right ear with otorrhœa. No tinnitus, occasional pulsation in right ear ; no vertigo ; pharyngitis and rhinitis hypertrophica. Right meatus is filled with pus. Left drumhead contracted aud thickened. Tubes free.

Hearing of right ear : contact for loud voice, low forks not

heard, higher ones up to Galton's whistle well heard. Koenig 20,480. Left ear low voice 8 *m*, and all tones good.

All the static tests normal with eyes open, but with eyes closed a tendency to the right. Goniometer 35 °.

Dynamics : good with eyes open, but with eyes closed imperfect, equilibrium being maintained by balancing with hands and arms in all positions.

CASE 14.—A porter, aged thirty, deaf in left ear for a year; fell on the ice a year before, bled from the left nostril; was unconscious ; was treated with ice-bags. On leaving the hospital he could not walk straight, being hurled from one side to the other despite all his efforts. His sight was also imperfect.

His gait has much improved at the present time, a year later, but he still falls against people in the street ; his left leg is weak, he limps on that side, but his handwriting is not affected.

He has long been deaf on his left side after being boxed on the ear. Paresis of the rectus internus of the left eye was diagnosticated, and probably has some influence upon the vertigo.

B. C. localized on the right side ; right ear normal ; left drumhead contracted, with a small cicatrix in the lower quadrant. Loud voice not audible, audiometer perceived, forks poorly perceived ; high forks heard well ; hyperakusis.

With eyes open, all tests good ; closed, he falls to the right and forward.

The angle of inclination is almost normal, but he falls forward easily and grasps for support without actually falling.

The dynamic tests, with the eyes open, are normal ; with the eyes closed, he jumps to the right ; on hopping he gives labyrinthine hops, three or four long ones straight ahead, then smaller, and now to the right and then to the left, thinking all the time he is going forward as before.

Rotation tests are a failure.

CASE 15.—Doctor K, age thirty-nine ; deafness of left ear of many years' standing. Drumheads sunken and opaque. Hearing of right ear normal ; left ear, loud voice 1 M, forks between 32 and 1024 faintly. Galton 2, audiometer 4 M. Bone conduction good, but better on right side. With eyes open all the static and dynamic tests except rotation are normal, the latter needing balancing with arms and hands to complete. With the eyes closed, the static tests show swaying mostly to the left in all positions. To avoid falling he leaves his position of rest. The

dynamic tests with eyes closed are nearly normal except rotatory movements which he cannot accomplish without deviation to the left: occasionally to the right from the left foot alone.

A year later diminution of hearing, and increased vertigo, whenever he turned his head rapidly to the left. He was often hurled to one side with a tendency to nausea and vomiting. The vertigo was often accompanied with an invisible blow on the head. Attacks in the past month almost daily. Has never lost consciousness: lying in bed with eyes open or closed he feels as if falling over a precipice. The blow on the head seems to act from the right to the left. He complains of a dead feeling in his feet as if the floor had left him in the air. He stamps with his heels to be sure that he is standing firm. Hearing worse and slight tinnitus. Has abandoned tobacco and liquors, but without improvement.

Hearing of right ear as before. Left ear: low forks not perceived; high ones well heard. Galton 3, and Koenig 16,384. Low voice on contact. All tests are normal with eyes open, but with eyes closed he wavers to and fro, and in walking deviates to the right or left, going forward to the right, backward to the left, and from the right foot hopping forward to the right, and from the left to the left. Rotation tests defective to the left.

Treatment with cocain instillations into the ear and insufflation of cocain vapor by the catheter twice a week improved his condition so that he could walk more securely, his feet lost their numbness, the vertigo disappeared, and he was able to do work without distress.

Case 16.—A child of eight years. Soon after vaccination, was attacked with a long illness, either typhus or meningitis, and by all physicians a fatal prognosis was given. The child, however, recovered slowly. Later pneumonia. The child was very slow in walking, and often fell to the floor. Deafness has gradually supervened.

The child is anæmic, but bright. On rapid movements she falls forcibly to the floor, and on darkening the room she can hardly get about. Rhinitis and adenoids; tubes close. Cocain-resorcin, catheterization and bougies, and removal of the adenoids. The result on the disturbances of co-ordination was absolutely null.

Hearing with right ear: low voice 2 *m*; loud voice 5 *m*; high forks heard; bone conduction best, right. Left ear: low voice 5 *m*, low forks nothing, high forks well heard. No vertigo.

With eyes open static tests normal; closed, she wavers to the right and forward. From right foot, on closing eye, falls to left; from left foot, falls to right. On the goniometer the left shoulder bends forward, and the body to the left. On lifting slowly she falls forward and has to be held. Inclination 10°.

The dynamic tests show deviations even with the eyes open. Rotatory motions are imperfect; some cannot be performed without leaving her position, others she cannot do at all. On closing the eyes there is deviation to the right. Labyrinthine jumping and tendency to the left. Hopping irregular; on right foot, to the left. On the left foot she hops well, but gradually inclines to the left and backward. Rotation tests with the eyes closed, tendency to fall to the right.

CASE 17.—A workman of twenty-six; loss of hearing and tinnitus left ear. Vertigo on bending forward. Tinnitus is like hissing or whistling. Right ear normal; left ear: audiometer 0, loud voice not heard, low forks heard fairly well, but no high forks. By B. C. all tones localized on the right side.

Static and dynamic tests with the eyes open, normal; but with the eyes closed, in the direction of the healthy ear. *In other words, with almost total deafness in one ear, the disturbances of equilibrium are in the direction of the good ear.*

CASE 18.—Aged thirty-one; tinnitus during mental exertion with loss of hearing (no vertigo) first in one ear and then in the other. No treatment. The tinnitus is of double nature: one pulsating noise, permanent; a second, hissing noise, occasional.

Hearing very poor in both ears; high forks well perceived. B. C. good for all tones.

When standing on his toes he inclines forward with great impetus. The angle of inclination is normal. Dynamic tests normal with eyes open or shut.

The case is probably *one of otitis media sclerotica with slight disturbances of equilibrium, probably due to increased labyrinthine pressure caused by stapes anchylosis.*

CASE 19.—Doctor C., æt. fifty; at the age of thirty-two has a sudden attack of vertigo, with heaviness in head and bent body lasting for several months. This was diagnosticated as anæmia of the brain from overwork. He improved and three years later suffered from attacks of falling, and was afflicted with a dread of falling, which was relieved by large doses of bromide of potash. The right ear gradually failed, and tinnitus has set in for the past

year. The vertiginous attacks have long been constant; even when sitting at his desk, his head falls forward despite all efforts to the contrary. In January, 1894, he could not make a step, and even abed he felt as if his feet were being raised into the air and his head sinking down into space. Rest has improved his general condition, though at times he falls as of old. Catheterization has no effect on the hearing or tinnitus. The right ear feels as if filled with a foreign body. The hearing of the right ear is moderate, that of the left ear fair, and all forks are heard well. Bone conduction is doubtful, but better in the right side.

Static test: wavering to the left with eyes closed. Dynamic tests good, except in rotation when he bends his knees.

The instillation of cocain and insufflation of cocain vapors improved the hearing and tinnitus. His mental condition improved, but it is doubtful if it will remain permanent, as from the history of the case the brain is probably affected. I base this opinion on his behavior on the goniometer, when his angle of inclination was nearly normal.

Case 20.—Mr. 4, æt. thirty-five; soft chancre in 1883; drinks heavily. In 1894, whilst intoxicated, fell six M, on the right side, was taken home unconscious, bled from the right nostril, and remained a week in bed. No otorrhœa. On rising from his bed excessive vertigo, decreasing at the end of two weeks.

He soon returned owing to renewed attacks of vertigo, inability to walk straight, and tinnitus in the right ear. Iodide of potassium in large doses; vertigo ceased, but tinnitus remained. The iodide was continued all summer, and ether blown into the ear for the tinnitus. Deafness as before, memory weak, drinks a good deal, gets easily tired, writes as plainly as ever. Pupils react well, but right more than left.

Drumheads opaque and sunken; slight nasal catarrh.

Hearing of right ear for A. C. bad, loud voice not perceived, but high forks on contact. Left ear normal. By B. C. all tones localized to the left.

Eyes open, static tests normal; eyes closed, static tests all to the right, and backward. On the goniometer anterior and other inclinations normal, except right foot outside inclination is only 4°.

Dynamic tests good with eyes open; with eyes closed curious deviations in jumping and hopping, only to be shown in figures. Generally speaking, the patient starts well, then deviates to the

left, then stamps his feet, hops to the right, and then falls to the ground. Or, after jumping to the right, he falls backward. Again, he jumps zigzag, and falls to the right and backward. The rotatory tests are curious ; he turns part way round and then suddenly slides to the right ; and from that position turns a little more to the right, and then slides again and finally falls to the right.

CASE 21.—Miss ——, æt. twenty-three, has often seen objects double, and during nausea, green ; the color being formerly attributed to ascarides. Has had measles with otorrhœa and obliquity of the body to the left ; after some months the discharge ceased, and hearing was restored. When fourteen she suffered from occasional diplopia, and at fifteen accidentally hit herself on the forehead, the blow being followed with persisting pain. Last winter she got cold from living in a damp house, tinnitus set in, and attacks of vertigo and falling.

Brief description of a typical attack :

Sounds begin as if coming from afar, first as the rustling of trees, then like music, then like a roaring or rattling. The ears feel stopped up. This prodromal stage lasts several seconds. Objects now begin to look green, and vertigo ensues. Objects move from right to left, the bases remaining steady, the tips nodding forward. Later, objects seem to fall to the left and backward on the patient. If the eyes are closed the vertigo disappears. Nausea is often present. Sometimes all objects vibrate. The body moves to the left to prevent loss of equilibrium, and she clings to the sofa or bed. Occasionally the head alone is bent forcibly to the left, and nods like a bird in pecking at food. The heart beats forcibly, breathing is difficult. Finally the patient gives prolonged deep sighs and the attack is over.

Rapid motions favor an attack. The patient cannot taste bitter things without a tendency to nausea and an "attack."

Treatment : Hoffmann's elixir.

Static and dynamic tests a year later showed inclination to the left and backward, though with the eyes open the tests were nearly normal.

Three per cent. cocain instillations into the ear produced sleep. The vertigo gradually grew worse. Astigmatism was discovered and proper lenses ordered. The vertigo persisting, the glasses were more carefully fitted, but nevertheless no improvement obtaining, liq. ferri albuminati was given. Pain in the

feet remained a constant symptom. Gradually the patient improved, and the vertigo disappeared. She could work better with glasses, her gait became nearly normal, and all tests were good.

A portion of the symptoms were due to anæmia, and a portion to astigmatism, but whether the anæmia of the labyrinth or of the entire brain was the exciting cause, remains doubtful.

CASE 22.—Dr. M., æt. forty-four; poor family history of heart disease and congenital affection of the eyes, has always been anæmic, and suffered from bronchitis with hæmoptysis.

About five years ago, after severe mental labor, he suffered from hyperakusis, dizziness in walking, weakness of the eyes, and pain in the left temporal region. At a summer resort he gradually lost his hearing from damp winds. All treatment of the deafness in the left ear, and of the subsequent tinnitus, remained useless. In the following year the right ear also became affected. All of the symptoms were referred to neurasthenia. Hypnotism and galvanization were useless. The hearing decreased rapidly. Various specialists referred the now nearly total deafness to neurasthenia, others to a labyrinthine affection, or to anchylosis of the ossicles. The treatment suggested was iodidum potassii, ignipuncture in the occipital region, insufflation of æthereal iodoform.

In the following year the condition was diagnosticated as a disease of the auditory nerve or auditory centre. Frankliniza-tion was of some help. Proper hypermetropic lenses were worn. The hypodermatic use of strychnin nitrate was followed by diminution of the tinnitus. Pilocarpin and arsenic were employed, but followed by sleeplessness, and loss of what hearing had been regained. Electricity, sulphur baths, mercurial ointment, iodid. potassii, were tried, but the rapid deterioration after fifteen inunctions of the ointment caused it to be stopped.

In 1893 the patient grew worse. He was finally treated with spermin and the vision which was at one time poor gradually increased so that the former lenses were dispensed with.

Present condition, amblyopia congenita, presbyopia, drumheads concave, tubes open, constant tinnitus in the day but not at night. The tinnitus ceases on lying down. It is generally of a tertian type, worse every third day; on the first day it is slight, on the second worse, and on the third it is so intense that the patient finds no rest and feels almost insane. This periodicity has been marked day in and day out for years. Opening and closure of the eyes is accompanied with a metallic noise in the

ears. He sleeps well from 11 to 3, and then awaking remains so the rest of the morning.

Smell and taste good, no vertigo, handwriting normal, knee reflex good, no headache, can lift objects from the floor, buttons his coat easily, stands rapidly from his chair and walks along, but soon begins to sway and to tire, and then to stumble about. At evening his gait is unsteady. With his eyes closed he can move about easier in the morning than in the evening.

Hearing for speech and music lost, but sawing, cracking, clothes brushing, ticking of clock, ringing of bells, etc., are well perceived. The right ear alone can hear the following tones: fork 128, Koenig 10,240.

Static tests with the eyes open are maintained with effort, the single-leg ones being rather unsteady. With the eyes closed he falls forward, and from either leg alone he falls to the opposite side. Goniometer angle normal with eyes open, and only 9° or even 7° with eyes closed.

The dynamic tests with eyes open show wavering gait, labyrinthine jumps, hopping noisy, rotatory tests accomplished with great effort. With eyes closed, he falls backward at times, sometimes right and back, and then again left and back, according to the leg on which alone the hopping and rotation are attempted. As a rule, all the static and dynamic tests are indifferently performed, and the patient falls in either direction, showing an affection of the peripheral terminal apparatus. *Finally, when the tinnitus is at its worst, the disturbances of equilibrium are much more marked.*

In concluding this long paper, I would remark, that the examination of persons suffering from diseases of the ear may be of medico-legal importance. Thus I lately saw a case in which a railroad employee asked for damages after an injury to the head with subsequent and (as it was thought) simulated loss of hearing. The officials refused to pay for the alleged loss of hearing. The examination made before the legal authorities revealed serious disturbance of equilibrium, which alone made the man incapable of active employment. I pointed out to the medical experts employed by the railroad the significance of these disturbances based on my experiments as here laid out in detail, and on their recommendation the company paid the damages claimed.

A CASE OF ACQUIRED TOTAL DEAFNESS, THE RESULT OF INHERITED SYPHILIS; WITH POST-MORTEM.

By WALKER DOWNIE, M.B., F.F.P. & S.G.,

LECTURER ON DISEASES OF THROAT AND NOSE, GLASGOW UNIVERSITY; HON. AURIST, ROYAL HOSPITAL FOR SICK CHILDREN, ETC.

In October, 1891, a lad seventeen years of age, who was said to have become completely deaf during the previous six years, was brought to me at the Ear, Throat, and Nose Department of the Poliklinik.

His mother reported that he had been a weakly boy at birth and had continued delicate until five years of age. When seven years old his eyes became "inflamed," for which condition he was under treatment as an out-patient at the Glasgow Eye Infirmary for over two years. He was sent to school when eight, but before the session had closed the teacher recommended that he should be kept at home until his eyes were well and until his hair, which had begun to fall out, leaving bare white patches, had grown again. At eleven his scalp was free from patches, his hair was healthy and well grown, and his eyes were well and strong—that is, the redness and tenderness due to the inflammatory process had subsided, but his sight was bad, chiefly from the presence of corneal opacities.

While this improvement was taking place his hearing was becoming impaired; the left ear appeared to be first affected, but soon both were implicated, and at the end of six months he was totally deaf. The transition from the state of hardness of hearing to that of total deafness appeared to have taken place very suddenly. His mother described how she heard him sobbing bitterly one morning while lying in bed, and as she approached him he exclaimed, "It 's awa' a' together!" and from that time he was totally deaf.

Family History :

Inquiries into the patient's family history elicited facts illustrative of the terrible ravages resulting from the introduction of syphilis by a spouse.

The mother of the patient was fifty years of age when she came to consult me regarding her son.

She was married when twenty-three, and the following particulars of the results of her fourteen pregnancies are interesting :

First—A healthy male child born at full time. This boy died when six years old from inflammation of the lungs. Shortly after the birth of this child, the mother appears to have contracted syphilis, the early constitutional symptoms of which seem, from her own account, to have been severe and well marked. While so affected she become pregnant a second time ; and within fifteen months of her first confinement was delivered of a still-born female child at the seventh month.

Third—A male child born near the end of the seventh month, and which lived ten hours.

Fourth—Male twins in the eighth month, one still-born, the other survived two days.

Fifth—A female child still-born in the seventh month.

Sixth—A female child at full time. She is still alive and apparently in good health.

Seventh—A miscarriage in the third month.

Eighth—A female child still-born in the seventh month.

Ninth—A miscarriage just over the third month.

Tenth—The patient, now seventeen years old.

Eleventh—A female child at full time, still alive and in fairly good health.

Twelfth—A miscarriage in the third month.

Thirteenth—A female child at full time who died from measles when two years old.

Fourteenth—A miscarriage in the fourth month—this occurring five years ago.

Patient's condition when first examined.—The lad, who was described as having formerly been bright and smart, was listless and stupid, and he was thin and anæmic. His forehead was somewhat prominent, his nose well formed, the cornea of both eyes was of ground-glass appearance generally, with several patches of distinct opacity, his incisor teeth were serrated, his

palate high and narrow with prominent transverse ridges, and his voice was monotonous.

When his hearing became first affected he complained of severe pain in both ears and of loud noises in the ears and head, but these had long since disappeared. He never had discharge from either ear, nor any history of middle-ear disturbance.

To the sound of the voice, the tuning-fork, and loud bell he was totally deaf. Occasionally in his eagerness he said he heard the tuning-fork when placed over his mastoid, but this occurred quite as often when the tuning-fork was at rest as when vibrating.

Both meatuses were normal in form and appearance, and both tympanic membranes were intact, slightly indrawn, and somewhat whiter than the normal.

Over the right parietal eminence there was a prominent swelling, smooth, hard, and painless, the base of which measured an inch and a half long by fully one inch broad. It was explained that two years previously he was struck by a piece of wood on the right side of the head. Considerable pain followed the receipt of the injury and a swelling resulted which had gone on increasing in size. Several similar, though smaller, swellings over other parts of the head had been observed in the interval, but these had disappeared, in some cases after days, and in others after weeks.

The use of gray-powder and the regular application of mercurial ointment were prescribed, though with but small hope of benefit accruing. At the end of six weeks he returned and his mother reported that he could hear the rumbling of carts passing along the street, and he himself, from this fact, felt hopeful of further improvement. No change, however, could be discerned on using the various tests, but as his general health had markedly improved, continuance of the treatment was advised.

While he remained under observation his general health steadily continued to improve, and he was able to do some work in connection with his father's bakery. Increase in the size of the swelling (gumma) over the right parietal region was noted from time to time. At the end of six months from date of first observation there was no doubt but that he could hear the sound of a vibrating tuning-fork by osseous conduction for about one fourth of the length of time it was audible to a normal ear.

I did not again see him until requested to meet the family attendant on the 12th of June, when I learned that shortly after

his last visit to the dispensary (March) the swelling on the head began to discharge watery fluid, and then to break down and give rise to a highly fetid discharge; and for this reason he had been kept at home.

On the morning of the 10th of June he had worked for some hours "baking and firing," and having finished he washed himself and sat in front of the kitchen fire to read. While so engaged the book fell from his hands several times, and on his mother's correcting him for his apparent carelessness she noticed that his hand twitched and he became convulsed on the left side and would have fallen from the chair had she not caught hold of him. When laid in bed it was found that he had paralysis of the left arm and left leg. On the following night he had a second seizure in which his convulsive movements were less marked and chiefly affected the face.

I found him much emaciated, conscious, and intelligent, though he spoke with difficulty. The area occupied by the swelling was now nearly as great as the right parietal bone itself, and the swelling was fungus-like, composed of broken-down inflammatory tissue, together with sloughing scalp and brain tissue. I recommended his removal to the hospital, which, however, was not accomplished till the 16th. On the morning of the 17th June he was put under chloroform, the scalp thoroughly cleansed, and the sloughing material cleared away. I then removed a considerable part ($1\frac{1}{2}'' \times 2''$) of the right parietal bone, wholly necrosed, and this permitted a large quantity of very fetid pus to escape. In the ward journal it is reported that "paralysis of the left arm and leg and left side of the face, present on admission, became more marked shortly after operation. There is also during renewal of dressings considerable protrusion of more or less disorganized brain-substance through the opening in the skull. He continued fully sensible and fairly well till the 22d, when swallowing and breathing became difficult and he died somewhat suddenly in the afternoon of that day. He had no convulsions after the operation."

A **post-mortem examination** was made next day and the following is an abstract of the report:

"The surface generally is pale and the body very spare. There is a gaping partly incised wound near the summit of the head to the right of the middle line, the anterior border of which is immediately above the external meatus.

This wound is occupied in its middle part by a soft hemorrhagic mass which projects through an opening in the skull. There is a considerable gap in the *duru mater* to which the brain-substance is partly adherent. A corresponding gap is in the brain-substance, which may be in general described as involving the ascending parietal convolution, except its lower extremity, and a considerable part of the parietal lobe. At the base there is considerable purulent infiltration of the soft membranes extending somewhat into the Sylvian fissure.

"Along the right border of the liver numerous deep cicatrices, but no actual gumma, were found. The thoracic and abdominal organs generally were found to be in a highly amyloid condition.

"The right temporal bone was removed and placed in an acid solution for section.

"On examining the bone externally, the small size of the mastoid process was the only feature in which it appeared to deviate from the normal.

"The bone was then bisected, cutting through the long axis of the petrous portion, thus exposing the external meatus throughout its length, the tympanum, the anterior portion of the cochlea, and the internal auditory meatus.

"The external auditory meatus was found normal in appearance; the tympanic membrane thin and translucent and free from adhesions. The malleus was healthy and normal in size and form. The incus, which was displaced during section of the bone, was healthy; but the base of the stapes was incorporated with, or ossified to, the border of the foramen ovale and so had become immovably fixed to the inner wall of the tympanum. The lining membrane of the tympanic cavity was intact and the Eustachian tube patent.

"The tympanum was of average size, the attic well developed, but there were no interstices in the bone posteriorily *i. e.*, the mastoid bone which as stated was unusually small was solid.

"The internal auditory meatus was next examined. At its inner extremity it was of average normal calibre, and both the auditory and facial nerves contained therein were healthy. But tracing it outward at a distance of 1 *cm* from

the inner opening, the upper wall became suddenly thickened, encroaching on the canal and at a farther distance of 3 *mm* the canal was almost completely obliterated.

"The vestibule was so greatly encroached upon as to make it doubtful whether any portion of this space remained. The cochlea was readily examined and was of average size, but the modiolus and lamina spiralis ossea were so thickened as to occupy an unusually large proportion of the cavity of the cochlea. Of the semicircular canals only a trace of the external (horizontal) one could be found, the remaining portion of this part of the labyrinth being lost in a mass of dense bone of ivory hardness.

"The chronic inflammatory process which had led to such extensive new-formation of bone-tissue was, I think, undoubtedly syphilitic in character. It resulted in solidification of the usually spongy mastoid, in the obliteration of the outer third of the internal auditory meatus, with consequent destruction of the vitality of the auditory nerve, and it not only thus cut off the internal auditory meatus from the internal ear, but it resulted in the obliteration of a large portion of the labyrinth itself, and all this up till the end with no other result than complete loss of hearing."

THE UPPER-TONE LIMIT IN THE NORMAL AND DISEASED EAR, AS DETERMINED BY THE GALTON WHISTLE.[1]

By H. A. ALDERTON, of Brooklyn, N. Y.

THE work accomplished by Siebenmann, Bezold, and Zwaardemaker in determining the upper-tone limit elicited in the normal ear by means of the Galton whistle has been so thorough and so well thought out that any further work in the same direction must be mainly with the idea of comparing the reactions of another Galton whistle with theirs. Some slight differences, mostly unimportant, are sure to exist, leaving, however, the general principles but the more firmly established.

The Galton whistle, forming as it does our most convenient, and, next to the Koenig rod, our most reliable means of finding the upper-tone limit, still has its limitations, these, however, applying more particularly to the extreme upper portion of the scale, where the whistling sound is so apt to be confused and obliterated by the puffing or blowing sound produced by the superabundant air over and above that necessary to bring out the musical note. The precautions necessary to reduce this to a minimum become quickly apparent to the user of the instrument, and therefore space forbids their introduction here. Suffice it to say that, as a result of the experiments of Bezold and others, it has been found that the reactions of the normal ear to the Galton whistle vary between the divisional mark of 1.25 on the scale for children, and 3.03 (Bezold) or 4.8 (Zwaarde-

[1] Read before the American Medical Association of Baltimore, May, 1895.

maker) for the aged, according as you accept the finding obtained by the one or the other investigator.

For practical purposes, it is sufficient to know that from 1.25 in childhood the upper-tone limit normally descends until, in persons over sixty years of age, from 3. to 5. is indicated on the scale. The writer has been able to confirm the results arrived at so far as young people are concerned, but the great difficulty of finding any number of aged people with normal ears, and still more with normal mental endowments, who could be induced to lend themselves to experimental purposes, has so militated against his success that he feels inclined to leave that portion of the field in abeyance, simply expressing the opinion that such work as he has done points rather to the more moderate reduction (3.03) noted by Bezold.

The study of the upper-tone limit in the pathological state has been touched upon by a few investigators, more or less sporadically, but especially by Siebenmann. So far as the writer knows, however, the results have not been arranged systematically by any one in English, with the possible exception of Dench.

The writer examined, during the year 1893, some five hundred pathological cases, and takes pleasure in presenting the results for whatever of value may be inherent in them. In the following table the ages and the Galton responses are averaged, and compared with the normal reactions at ages corresponding to the average age of the pathological cases studied. In all the cases enumerated throughout this paper, the diagnosis was arrived at by a comparison of the objective and subjective symptoms; the watch, whisper, and entire series of tuning-forks being used in conjunction with the Galton whistle, the last often being held back until after the diagnosis was made. In the diagnosis the result of treatment was considered when recorded. Through some oversight, or more probably because of a desire not to prolong the agony of patients suffering from otitis media purulenta acuta, the writer was very much surprised in collating to find that the reactions of not a single case had been taken in such manner as to fulfil the requirements of a scientific

study, either the tuning-forks, whisper, or Galton having been dispensed with.

Table.

Disease.	Number of Cases.	Average Age.	Average Galton.	Normal Galton at Same Age.
Cerumen	11	31	1.58	1.51–.58
O. M. C. Sub	6	24	1.55	1.37
O. M. C. A	3	31	1.97	1.5
Tubal Catarrh	8	37	1.58	1.6
Tubal Obstr.	31	12	1.6	1.35
O. M. C. C	56	30½	1.83	1.45
O. M. P. C	18	25	2.02	1.37
O. M. P. R	5	19	1.78	1.35
O. M. Resid	22	19	1.97	1.35
Labryinthine Anæmia	4	20	1.5	1.36
Neurasthenia	13	28	1.6	1.37
Hysteria	1	15	.8	1.35
Nerve	70	43	2.7	2.1
O. M. C. C. et Int	198	41	2.98	1.95
O. M. Res. et Int	28	40	3.09	1.8
O. M. P. C. et Int	7	43	2.64	2.1
Tubal Obst. et Int	7	27	2.45	1.36⅛
O. M. C. Sub. et Int	6	56	3.95	2.85

Because of the limited number of cases in some of the diseases, it is possible that the results in these diseases are valuable merely as indications of about what may be expected through investigations in the future. Taken as they stand, it would seem as though certain deductions were permissible; for instance, that in non-inflammatory diseases of the external canal the upper-tone limit is not lowered, *i. e.*, is normal. That, comparing the average of the tone limit in middle-ear diseases with that in the normal ear, a lowering of from .18 to .55 is noticed, with the exception of the limit in cases of tubal catarrh, and here the number of cases is so small and the chance of similitude so great that the writer defers and gives his adherence to the results obtained by Siebenmann, which coincide with the results of all the other middle-ear diseases. That in functional affections of the

labyrinth or nerve, the upper-tone limit is very slightly impaired and may even be elevated in hyper-sensitive conditions. That in labyrinthine or nerve diseases the average upper-tone limit is .6 below the normal, many of the cases in the table being pure nervous cases at their inception. That combined middle- and internal-ear diseases are capable of producing a lower average upper-tone limit than internal-ear disease alone. Since both middle- and internal-ear disease have the tendency to lower the upper-tone limit, it is but natural to expect that when combined they should produce a lower reaction than when either exists alone.

While it is true that in general the Galton and Schwabach tests give logical and corresponding responses, *i. e.*, lowered upper-tone limit and lessened duration of B. C. are accompanied by lessened perception of whisper and watch; still there are numerous cases giving conflicting and confusing responses. Thus in old age the upper-tone limit may be diminished out of proportion to the B. C., which may be fairly good throughout. Cases of apparently uncomplicated middle-ear disease with good Galton, intensity —R, and whisper not bad, may have impaired B. C. In one case of O. M. Residuosa, the Galton may be reduced and not in another, both having apparently normal nerve reactions.

Often, however, an apparently confusing reaction when studied is found to conform to the formulas given above: Thus, in some cases of Res. et. Int. one ear may have as good as or even better B. C. than the other, but the intensity —R will have climbed higher up the scale and the whisper and watch be heard worse. In the former the Galton may be worse and also the A. C. will be absent farther up the scale. This is explained when it is remembered that middle-ear conditions while increasing the duration of B. C. and impairing A. C., may also diminish Galton.

Variations in otitis interna: you may have duration of B. C. good, intensity + R throughout, and whisper and watch heard fairly, and yet Galton be considerably shortened, —up to 2.7; or whisper, watch, A. C., and Galton impaired, and yet B. C. be normal or nearly so.

Also, in nerve cases, great impairment of duration of

B. C., especially for the higher forks, may be present and yet Galton be very good. In fact, in beginning nerve lesions the higher forks may show diminished duration of B. C. before Galton is impaired. This probably indicates an ener vation or weakening of perceptive ability—a condition of nerve tire. Even great diminution of watch, whisper, A. C., and hiatuses in B. C. may co-exist and yet the Galton be but little impaired.

The gravity of the nerve lesion is not always indicated by Galton or Schwabach tests. The B. C. may not be heard at all from C′ up, and yet the Galton be heard comparatively high—3.1 to 2.2,—the whisper and watch being heard comparatively well ; while B. C. may be heard from C″ down or throughout, but watch and whisper zero and Galton 6.7 to 5.8.

Apparently the state of the nerve as exemplified by duration of B. C. may be better in one ear than in the other, and yet the Galton be heard better in the ear with the poorer nerve.

Variations in cases of O. M. C. C. et Interna: A case may give no indication by tuning-fork that there is any other than a nerve lesion, and yet Galton is normal or nearly so, and catheterization gives improvement to hearing. Or the other ear shows by tests such a mixed condition to exist.

With the other tests giving very similar responses, the Galton in one ear may be much worse than in the other. Or with other tests similar, the B. C. may be better in the ear with the poorer Galton, and this ear may show improvement on treatment, whereas the other ear may not.

You may have whisper and Galton worse in one ear than in the other, and yet the duration of B. C. be better in the poorer ear.

You may have an hiatus in the B. C., and yet the whisper, watch, and Galton be only moderately reduced.

Some cases give even better Galton and B. C. in one ear than in the other, but the whisper is heard not so well, and the A. C. is found much less than in the other, and the −R extends higher up the scale.

There exists no doubt in the writer's mind that when a sufficient number of these exceptional cases are brought together the explanation of the apparent deviation from the foregoing formulas will be brought to light, and that more experience will but prove that thorough testing of the hearing ability in most pathological conditions will be the necessary preliminary to a scientific diagnosis and therapy.

THE TREATMENT OF POLYPI AND GRANULATIONS.

By URBAN PRITCHARD.

THE following short annotation upon my method of antiseptic treatment in connection with the removal of polypi and granulations will, I trust, be of interest to some of my confrères; for although it is but the application of those antiseptic principles now generally adopted in modern surgery, yet the results accruing from its use have been so satisfactory that some account of it may be acceptable to our readers.

For three or four days before operation the affected ear is thoroughly syringed out, three times daily, with a 1 in 40 warm solution of carbolic acid.

On the morning of the operation the auricle and cartilaginous meatus are thoroughly purified with a 1 in 20 solution of carbolic acid; the deeper meatus and middle ear are again syringed with the 1 in 40 solution, and this is followed by an instillation of the same strength, or of 1 in 20, if the ear will tolerate it, as it often does. Of course with children and susceptible adults it is necessary to be somewhat more sparing in the use of carbolic. The instillation is allowed to remain in the ear for ten minutes or a quarter of an hour, the head being inclined over to the opposite side; it is then allowed to run out, the cartilaginous meatus is lightly plugged, and the auricle is covered, with double cyanide gauze (wrung out in 1 in 20), and a bandage is applied over the whole.

Before commencing the operation, which is carried out

under strictly antiseptic precautions as regards the instruments, the surgeon's fingers, and everything that is brought in contact with the parts, the ear is again syringed with the 1 in 40 solution; and after the removal of the polypus or granulation has been effected, its base is well curetted and any carious spots thoroughly scraped; the blood and débris are then syringed out with 1 in 40, and a plug of double cyanide gauze is lightly packed down on to the affected area, care being taken to dissolve out the irritating soluble cyanides from the gauze by first thoroughly wringing it out in a 1 in 40 carbolic solution. Finally, a dressing and bandage are applied to the auricle.

The subsequent dressing depends upon the progress of the case. As a rule, this requires to be changed only every second or third day; no syringing is necessary, and the case may be entirely healed within seven or eight days. The presence or absence of pain, temperature, or discharge determines the question of whether the dressing should be renewed more frequently or not. Sometimes a slight seromucous discharge remains which requires instillations of alcohol in order to complete the healing. In cases where the otorrhœa does not cease promptly the surgeon will have to resort to the ordinary treatment; *i. e.*, frequent syringing, alcoholic instillations, etc., but even with these such treatment will be much shortened by this antiseptic method of procedure. And not only is it of value in this respect but it also may be said practically to abolish all risk of septic infection.

It is scarcely necessary to point out that in these highly septic cases mere aseptic treatment is valueless.

A CASE OF LIVING LARVÆ IN THE EAR WITHOUT PREVIOUS SUPPURATION.

By WILLIAM C. BRAISLIN, M.D.,

ASSISTANT SURGEON, AURAL DEPARTMENT, BROOKLYN EYE AND EAR HOSPITAL.

REPORTED cases of maggots of dipterous insects found in the aural canal, in which purulency was not the existing and acting cause of their occurrence, are rare.

The writer has been able to find four instances recorded, namely that reported by Dr. Gruening at a meeting of the New York Ophthalmological Society in 1882; one in the ARCHIVES OF OTOLOGY, vol. xx., No. 1. by Baxter who refers to a similar case of Dr. Kuntzmar. A case was likewise reported in the ARCHIVES OF OTOLOGY, vol. xxiv., Nos. 3 and 4, by C. W. Richardson.

The larvæ, of which in the present case there were five, were, so far as can be determined, those of the Texas screw-worm fly (*Lucilia macellaria*).

A fact of great interest in connection with this case, in view of a possible solution of the question "How and why were they placed there by the parent insect?" was the co-existence of a fœtid nasal catarrh.

It is well known that flies of this class, while in the larval stage, feed on carrion, and that the parent seeks such matter, attracted by its odor, and, guided by the sense of smell, thus finds a place suitable for the deposition of her eggs. That the sense of smell alone determines the place of their deposition is shown by Dr. Blake (ARCHIVES OF OTOLOGY, vol. ii., No. 2), who found that the blue-bottle fly deposited her eggs on a piece of silk from which some putrid meat had been

but recently removed. In the following case the probable focus of attraction for the parent insect seemed to be an odor originating in the nose of the patient.

The history of this case is as follows:

Sam Eis, a barber of German birth and Hebrew parentage, twenty-five years of age, came to consult me at nine o'clock on the morning of July 22, 1895.

He complained bitterly of pain in the right ear, stating that it had existed since twelve o'clock the preceding night when he was awakened by it. The ear felt as if there was something in it. To relieve this symptom he had "dug at" the ear with a pin, following which there was oozing of a small quantity of watery, bloody material.

He had never had pain or any trouble whatever of the ear up to this time and he knew no reason for the present attack. The pain extended forward to the eye of the same side. The eye looked watery and the tissue about it seemed somewhat swollen so as to slightly close it. Examination revealed nearly normal hearing.

On first inspection of the ear nothing to account for the severe pain was observed. There was a slight amount of redness about the short process. Closer inspection revealed, on the walls of the canal among fragments of exfoliated epithelium, small white objects with curious "vibrio" movements which suggested the lashing motion of certain bacteria seen under microscopical examination. There was no perforation of the membrane.

Vapor of chloroform was blown into the canal. The ear was then syringed. Among the small masses of epithelium were five small maggots.

Pain in the ear now stopped entirely and the pain complained of in the right eye was said to be "easing up" too.

When seen a few days later the patient stated that all symptoms subsided following the syringing and that no trouble in the ear had since existed.

The patient, whom I have known in his tonsorial capacity for several years, was unable or unwilling to communicate any facts which might throw any light on the time or manner in which the eggs, from which the larvæ hatched, were deposited in the auditory canal.

He denied being under the influence of liquor, but said he had

been at Coney Island the day preceding (Sunday), and while there had taken a surf bath.

It has often been the experience of observers to find, in cases of maggots occurring in the aural and nasal canals, that the patient has slept soundly or has been in complete or partial alcoholic narcosis out-of-doors at some time shortly preceding the onset of symptoms.

The larvæ were white, except that at one extremity a small black line showed the alimentary canal; they were each 2 *mm* in length.

The size of the larvæ in this case was very small, showing that pain was developed at an early period of their growth. This we may suppose to have been due to two reasons. First, that the auditory canal, being free from chronic suppuration, was in a normally sensitive condition; secondly, that the maggots, from lack of pus to feed upon, were compelled to make active inroads into the living tissues earlier in their life-history than they find necessary in cases of chronic suppuration.

Unfortunately the species of larvæ in this case was not absolutely determined.

Immediately after syringing the pus from the canal, one of the larvæ which still showed signs of life was placed in a piece of raw flesh, with the design of determining the exact species by allowing it to develop into a perfect insect. The hope of its perfecting itself was not realized.

It is, however, highly probable that the larvæ were those of the screw-worm fly, *Lucilia macellaria*,[1] which has been figured and described in several agricultural bulletins, being of economic importance by reason of its destructiveness to cattle. These flies are usually attracted by the odor of decomposing matter or open sores, and laying their eggs therein thus propagate their species.

In the absence of any odor of pus from the ear we were led to look for a cause elsewhere which might have served

[1] Specimens of the larvæ of this species were kindly sent to me by Dr. M. Francis of the Texas State Agricultural College, to which the specimens of the case under consideration bore a close resemblance, while they resemble not at all those of the *Musca* or blue-botttle genus.

to attract insects whose instincts lead them to select localities for the deposition of their eggs where fœtid or decomposing odors are present.

A fœtid atrophic rhinitis from which the patient is a sufferer seemed to the writer to be the undoubted focus of attraction for the fly which, from some cause determined by instinct, deposited her eggs within the canal of the ear.

A CASE OF PAPILLOMA OF THE TONSIL; REMOVAL.[1]

By JOHN B. ROBERTS, M.D.,

PROFESSOR OF SURGERY IN THE PHILADELPHIA POLYCLINIC AND TO THE WOMAN'S MEDICAL COLLEGE OF PENNSYLVANIA.

I REPORT the following case because the condition is a rare one.

A girl of eighteen years came to the Woman's Hospital for treatment of a tumor of the left tonsil which had been growing for two years. Inspection made it evident that it was not hypertrophy of the tonsil. A large dendritic growth projected from the tonsil nearly all the way across the fauces, occluding the orifice of the pharynx and lying upon the root of the tongue. She complained, however, of no special symptoms, as far as I can remember, except the inconvenience produced by the bulk of the mass at the back of the mouth.

I operated on March 16, 1894, cutting away a large portion of the tumor with the tonsillotome; and then removing other portions by means of forceps and a blunt-pointed bistoury, because the base of the mass was too large to go into the ring of the tonsillotome. I then prescribed a gargle of alum and tannic acid.

Three weeks later I cut away a small remaining portion wtth the forceps and bistoury. I looked upon the tumor as a papilloma. This diagnosis is confirmed by Dr. Joseph McFarland, who says: "The tumor is dendritic, covered with squamous epithelium, and consists of lymphoid tissue principally. It ought from its histology to be a perfectly benign tumor, and not return. I suppose it grows from the tonsillar tissues."

[1] Read before the Section on Otology and Laryngology of the College of Physicians of Philadelphia, December 3, 1895.

I present the specimen which is in several pieces. It is a mass larger than an ordinary black walnut. It is deposited in the Mütter Museum of the College.

The patient has not been seen by me since a few weeks after operation.

Dr. H. T. Machell reports in the *New York Medical Journal* of January 19, 1895, an instance of a similar tumor of both tonsils occurring in a girl aged ten years. In his case the duration of the disease was about two years. He says that both tonsils were closely packed with papillary bodies, and that the child showed alteration in voice and in facial expression, had difficulty in swallowing, and was deaf. The tumors, which were ragged in appearance because of the pedunculated masses of which they consisted, filled the throat, hiding the uvula and resting on the base of the tongue. The growths extended down the throat as far as he could reach with his finger. Before treatment was adopted the child died from intercurrent scarlet fever. After death Dr. Machell readily enucleated one of the masses with his finger.

The photograph of this tumor shows gross appearances identical with the growth presented to the Section this evening. The microscopical report of the tumor so removed by Dr. Machell was made by Dr. John Caven as follows: "Microscopic examination of the tissue shows it to be *lymphadenoid* in nature. Unfortunately, improper hardening and preservation have so deteriorated the structure as to render sections very unsatisfactory. However, it is really a true hypertrophy of tonsil, tonsillar tissue being reproduced. Whether congenital or not I cannot determine. I have not been able to find a reference to an exactly similar condition in any work; the nearest to it is a papillomatous condition of the mucosa of the pharynx resulting from chronic pharyngitis. I would compare it with post-nasal adenoids."

The occurrence of papillomatous tumors in the tonsil must be exceedingly rare.

Boswell, in his work on *Diseases of the Nose and Throat*, says that all benign growths are comparatively rare in the tonsil, and explains the fact by calling attention to the retrograde changes that occur in the tonsils of adults, which make it a less likely seat of such neoplasms than other organs. In children, on the other hand, the tonsils are his-

tologically more susceptible to morbid processes; but at that period of life innocent tumors are less apt to occur than in adults. Since benign morbid growths are rare at the period of life when the activity of the tonsils is greatest, we can readily understand the infrequency with which surgeons meet with such tonsillar tumors.

Bosworth gives the notes of nine cases of fibroma of the tonsil which he has succeeded in finding recorded in medical literature, and also refers to one case of fibro-chondroma, one of fibro-lipoma, and one of fibro-lymphadenoma in this situation.

Papilloma, though apparently almost unknown in the tonsils, is the most common innocent tumor developed in the soft palate, uvula, and pillars of the fauces. It and adenoma are quite frequently seen in this situation. Bosworth has been able to find recorded but seven cases of fibroma and but three of angioma occurring in these structures.

In no text-book of diseases of the throat which I have examined have I found any reference to the occurrence of papilloma of the tonsil. My search, however, has not been exhaustive.

FURTHER OBSERVATIONS ON THE INDICATIONS FOR MASTOID OPERATIONS IN ACUTE PURULENT OTITIS MEDIA AND ITS COMPLICATIONS.[1]

By H. KNAPP.

IN a paper on the above subject published in the July and October number of the ARCHIVES OF OTOLOGY, 1895, one of my conclusions (No. 3, p. 267) was:

Even if a patient does well, and seems cured, we should, for weeks and months, not lose sight of him.

I communicated in support of this thesis three cases which, after a temporary, non-operative convalescence, had severe relapses. Two of the three were cured by a mastoid operation; the third, in which the patient after the primary improvement withdrew from treatment and had not been operated on, ended fatally from suppuration of the mastoid with perforation into the posterior cranial and digastric fossæ and subsequent meningitis. To these cases I can add two of my recent practice which seem instructive enough to be published. The first is briefly mentioned in my former publication, being then still under treatment. His history is as follows:

CASE I.—Acute Purulent Otitis Media, with Mastoid Involvement, Glandular Swelling, and Facial Paralysis—Operation—Complete Recovery.

Jac. Krupnikoff, Hebrew, thirty-seven, family history good. Well until Sept. 22, 1895. Sudden pain in right ear, from a bath

[1] Read before the Section of Eye and Ear Surgery in the N. Y. Academy of Medicine, January 20, 1896.

the day before. Pain two days, discharge, relief. Return of pain in ear, extending to head, eleven days later.

Admitted to hospital Aug. 6, 1895. Stringy purulent discharge from right ear. Mastoid tender, especially over the tip and the lower and medial surface. Defect in inferior part of *Mt.* Auditory canal narrow, walls not bulging. When pus is wiped out, it soon appears again, coming mostly from the postero-superior part.

Hearing fair. Temp., evening, 100.5°. Urine, normal.

Treatment: Rest in bed, Leiter coil. Pain rapidly disappeared; temp. normal. Discharged Aug. 10th to be treated in Dispensary. Felt well until Aug. 21st, when he had severe pain on and below the mastoid. Discharge free, diminished night of Aug. 23d.

Readmitted Aug. 24th.—Considerable redness and swelling over and below right mastoid and right side of face. Skin doughy, sensitive and pitting on pressure. No fluctuation. Small amount of stringy discharge. Temp. 100°. Leiter coil.

Aug. 25th.—More swelling. Gland over angle of lower jaw swollen to the size of a walnut. Complete facial paralysis. Discharge scant. Walls of canal swollen. Leiter continued.

Aug. 26th.—Symptoms no better.

Operation.—Long incision. Bone reddish. At upper part of antrum pit a fold of periosteum entered into the bone. On chiselling underneath it the antrum was found empty. The cells below it contained a moderate quantity of thin pus. Granulation tissue and considerable pus were found in the tip. A probe passed through the tip freely into the digastric fossa. The insertions of the sterno-cleido-mastoid and digastric muscles were cut away clean from the tip, and the whole outer surface of the mastoid was removed. In the medial surface of the mastoid there was a large defect. In the digastric fossa no pus was found and none could be obtained by stroking the heads of the above muscles from below up. The periosteum was stripped from the digastric fossa inward and forward, in order to see whether there was no fistula leading into the posterior cranial fossa. While this was done a smooth, blue surface, soft to the touch with a probe, was noticed, apparently the bulb of the *internal jugular vein*, after its emergence from the jugular foramen.

Neither pus nor a fistula being found, I scooped out the mastoid cavity toward the antrum. While cleansing the rough medial surface with a sharp spoon, suddenly a large quantity of dark

blood welled out—*injury to the lateral sinus.* The hemorrhage was easily stopped by plugging with corrosive sublimate gauze. The operation being finished anyhow, I dressed the wound and sent the patient to bed. No reaction from the operation, except that for three days the swelling went farther down the neck, along the severed muscles, whereas it diminished in the other places.

Aug. 29th.—Dressing changed, no bleeding, wound perfectly sweet; dressed with boric acid powder, light plugging. General condition of patient good. Temp. normal.

Aug. 30th.—Swelling of neck almost gone. Facial paralysis less marked; no discharge. Temp. normal.

Patient improved rapidly. Discharged Sept. 14th. Wound almost closed; no more pain; symptoms of paralysis of facial still present, but less marked. No otorrhœa.

Patient was treated in Dispensary. Otorrhœa, swelling of tissues, and facial paralysis completely disappeared.

Examined Nov. 22d.

A linear scar 45 *mm* long, depressed, no fossa. Ear canal normal. *Mt* slightly irregular; short process and handle in position; light reflex divided, but bright. Other ear the same aspect.

R (operated ear): $h \frac{18}{24}$; L $\frac{24}{24}$. Voice $\frac{20}{20}$ each. F, A < O; from vertex louder in ear stopped up. Patent is cheerful, attends to his business (grocery) without any discomfort.

Jan. 25, 1896.—Seen the last time; is perfectly well and has had no trouble since the operation.

REMARKS.

The patient had an ordinary acute attack of purulent otitis media which improved rapidly, when on the third day discharge had set in. Having a relapse eleven days later, he was admitted to the hospital, where by rest in bed and antiphlogistic treatment (Leiter's coil) his temperature fell from 100.5° to the normal, and he felt so well that in four days he could be discharged for treatment as an out-patient.

In eleven days again he had another severe relapse, with rise of temperature, swelling over the angle of the lower jaw, and complete facial paralysis. The Leiter coil this

time did not benefit him, so that I operated on him two days later. The mastoid was extensively laid open, and the exterior table from the antrum down to the tip removed. There being communication with the digastric fossa, I detached the muscle-insertions completely and stripped the periosteum off forward and inward till the bluish bulb of the internal jugular vein was seen. While curetting the brittle inner wall of the mastoid with a sharp spoon the sigmoid sinus was wounded. The convalescence was undisturbed, and the patient left the hospital nineteen days after the operation. He recovered perfect hearing, perfect mobility of the face, and has been free from discomfort ever since.

The *facial paralysis* was most probably caused by perforation of the Fallopian canal and pressure of the inflammatory product (pus) upon the nerve in the lowest, subtympanic, part of its course. This part in many specimens is surrounded by numerous air cells, in which, in the case under observation, the suppurative inflammation was particularly marked. In support of this supposition I may call to mind that the stylo-mastoid foramen, through which the nerve passes, is situated at the anterior end of the mastoid groove. In the case under consideration the probe passed readily from the mastoid cavity into the groove. It is not likely that the soft parts outside the mastoid, though considerably swollen, could have exerted sufficient pressure to paralyze the nerve.

Another case, in which the remission of the symptoms after paracentesis of the drum membrane and the setting in of the discharge was, however, not very marked, is remarkable by its course, during which in the sigmoid sinus and at the bottom of the middle fossa the dura mater had been exposed, with perfect absence of any subsequent reaction. Not infrequently are the symptoms in purulent otitis media equivocal, yet so grave that an exploratory opening of the cranial cavity is recognized as a legitimate procedure. Our case is another illustration of the fact that this operation can be done without injuring the patient.

The case is as follows:

CASE II.—**Acute Purulent Otitis Media, with Marked Cerebral Symptoms—Paracentesis of Drum-Membrane—Opening of the Mastoid, with Exposure of the Lateral Sinus, as well as the Dura Mater at the Bottom of the Middle Cranial Fossa—Recovery.**

Mrs. B. Odorowsky, Hebrew, æt. forty-nine, having undergone some operations on several parts of her body in Russia, but apparently of a healthy constitution, had at the beginning of Nov., 1895, an operation performed on her left clavicle, which has left a linear scar of 2½ inches in length. Two weeks later the left ear began to ache, this being the first time in her life that her ears had given her any trouble. Not finding relief in a few days, she went to the N. Y. Ophthalmic and Aural Institute and had a paracentesis performed. The ear discharged and felt easier for several days, but when it pained again she went to the Dispensary of the Mt. Sinai Hospital, where cold applications to the mastoid and syringing of the ear were ordered. This treatment afforded her some relief, but soon the earache returned with increased vehemence, and was accompanied by intense pain over the whole left side of her head. In the evening she sent for her family physician, who, the next day, sent her to me.

I found the discharge stopped, the *Mt* entire, the upper posterior part at the depth of the ear canal red and slightly swollen, and excessive tenderness by pressure on the posterior edge of the mastoid process, on a level with the upper end of the orifice of the ear canal. Pain and a sensation of heat in head. No nausea, no dizziness. I ordered her quinine 0 75 three times daily, rest in bed, warm ear douches, and cold applications to the mastoid.

She felt relieved for a few days, then the pain in the ear and head increased, the posterior part of the mastoid became slightly puffy and very sensitive on pressure ; the remainder of the mastoid, in particular the antrum pit and the tip, as well as the muscle-insertions on it, free from pain. The ear canal was normal ; the drumhead had re-formed, was pinkish, not bulging anywhere. Temp., 99°, pulse 70. No changes in fundi of eyes. Urine normal. Voice, $\frac{12}{60}$; watch, $\frac{0.5}{24}$.

My opinion was that the purulent inflammation of the middle ear had subsided in the tympanum and antrum, but was still active in the posterior part of the mastoid, involv-

ing the bony wall of the sigmoid groove, with perisinuitis, and possibly epidural abscess.

I admitted her to the hospital Dec. 7, 1895, and *operated on* her Dec. 9th.

A slightly curved incision was made 1 *cm* behind the insertion of the auricle. After the periosteum was scraped aside, an opening was chiselled into the antrum, and enlarged up and down. The bone was very hyperemic, but the antrum as well as the upper and lower cells were free from pus and granulation tissue.

An incision through skin and periosteum was then made from the antrum directly backward a few lines beyond the posterior edge of the mastoid process. The bone was chiselled in the same direction. At a depth of about 4 *mm* the bone near the posterior edge was vascular, and a bead of pus made its appearance. Chiselling deeper more pus was found. The bone was frail, cancellous, and filled with granulations. These and the brittle bone were removed with a sharp spoon. Thus a cavity was dug, the bottom of which on probing felt so soft that I received the impression as if the bony wall of the sigmoid groove had also been removed, so much the more as the probe could be introduced 4 or 5 *mm* along the bare inner surface of the bone cavity. The bone in the tip of the mastoid proving hard and free from pus and granulations, I abstained from extending the operation in that direction.

Dec. 10th.—Patient had pain in wound until midnight, then felt comfortable.

Dec. 11th.—Had a bad night; pain in vertex and temple depriving her of sleep. The wound dressed; it was clean and odorless: no elevation of temp., pulse 67.

Dec. 12th.—No pain at night, but considerable in vertex and wound since morning. Wound discharging pus, looks healthy. Tip of mastoid red and sensitive to pressure.

Dec. 13th.—Had a good night, no pain. Wound dressed, in good condition. Discharge of pus. Pain over mastoid has left.

Dec. 22d.—Patient had good days, alternating with bad ones. Her appetite, which had been almost altogether wanting, returned in a measure. Bowels regular, with a tendency to diarrhœa. On her bad days she felt very weak, the pain in head became very intense, extended to the shoulder, and was accompanied by

nausea, vertigo, and chilliness. Temp., 99° ; pulse, 60 ; resp., 30. She felt better when the wound discharged.

Dec. 23d.—Patient excessively feeble, almost in a stupor. Temp., 99½° ; pulse, 72. Fundi oculorum normal, as always before. No tenderness on pressure on any part of the mastoid, nor at the head or along the border of the sterno-mastoid muscle.

On account of the aggravation of the symptoms, it was thought that a focus of suppuration had not been reached, and the marked cerebral symptoms made it likely that the pus had extended into the cranial cavity either through the roof of the tympanum, or through the inner table of the mastoid. The tip of the mastoid, freely open on its upper side, and showing no symptoms in its point and its surroundings, in particular none in the digastric fossa, was not considered likely as being the cause of the prolonged disturbance. Epidural abscess and perisinuitis were supposed to be the most probable complications. Sinus thrombosis was excluded on account of the absence of the temperature-curve characteristic of this affection.

Operation Dec. 23, 1895.—Under ether narcosis the wound was thoroughly cleansed of all the healthy granulation tissue which in the process of repair had sprung from the bottom and the sides. The wound was chiselled larger and the *sigmoid sinus laid bare to the extent of 2 cm.* The bone wall of the sulcus was vascular and brittle, but there was no pus ; the sinus was bluish, clean, well filled, soft, and pulsating. Regular circulation in it being evident, no attempt was made to ascertain the quality of the blood by an aspirator needle.

The integrity of the posterior cranial fossa thus being sufficiently established, I enlarged the wound upward and forward with a chisel until I had *exposed a circle of the dura mater at the base of the middle cranial fossa of a little more than 1 cm in diameter.* No pus was found there either ; the dura mater had its normal appearance, and pulsated regularly. Under these circumstances, not feeling justified in extending the operation any farther, I cleansed the wound with corrosive sublimate gauze, dusted some boric acid powder in it, and tamponed it with sublimate gauze. The patient felt better for four days, and the wound did not discharge. Then the pain in the head returned, with chilliness, followed by heat

(temp., $99\frac{1}{2}^{\circ}$) and great weakness. The next day was good, then again an attack of headache, nausea, dizziness, chills, and heat. Quinine was ordered, 0.50 to 1.00 grm. daily.

While changing the dressing, the wound was curetted in every direction where the bone was soft, especially *down the tip, where there was diminished resistance toward the lower surface* (mastoid groove). There was no pus anywhere, nor had there been any secretion after the last operation, but a moderate amount of brittle bone could be scooped out from the lower-posterior part of the tip.

From this time on the patient steadily improved. The headache diminished, the wound became clean and gradually filled up from the bottom, without producing exuberant granulations. The quinine, which seemed to have a beneficial effect upon her recovery, was kept up in doses of 0.60 daily. On Jan. 2, 1896, the *Mt* was found entire, pinkish all over, and in normal relief; conversational voice was understood through the room.

Having become virtually free from pain, and growing stronger, with appetite and digestion good, she was dismissed from the hospital as cured Jan. 10, 1896. Her disease had lasted a little over two months.

Jan. 17, 1896, I examined her again. She was quite well, no pain. The wound was in good condition, closing. The *Mt* in normal position, somewhat dull. $h = \frac{3}{24}$, in the other ear $\frac{12}{24}$; $v\ \frac{20}{20}$, in the other $\frac{20}{20}$. F, A > O (tuning-fork better by aërial than osseous conduction).

REMARKS.

The history of this case shows the sudden onset of a purulent otitis media in a previously healthy ear. After several improvements and aggravations, she came to me with the middle ear in a fairly good condition of recovery, the mastoid in its anterior, middle, superior, and lower portions free from any visible or tangible abnormity; the posterior border, however, and the adjacent occipital region were puffy, pink, and very tender to the touch. That there was suppuration in this locality seemed evident. I located it in the cells near the inner cortex, probably affecting the cortex itself, possibly with deposit of pus in the sigmoid groove. The operation verified the supposition, yet not to

its full extent. After a remission of several days, cerebral symptoms (headache, nausea, vertigo, chilliness, and a moderate rise of temperature), as well as great prostration, made it appear likely that the suppuration had extended into the cranial cavity. The posterior cranial fossa was opened, the lateral sinus and the dura of the middle cranial fossa were exposed, but no suppuration was found. After an improvement of a few days quotidian or tertian attacks of chills and fever set in. They were improved by quinine. The wound exhibited a good condition, yet, on probing, the cells of the tip felt soft and yielding, especially toward the infero-posterior aspect. A few days previously the tip had been tender for one day. I curetted it, and found the medial portion particularly brittle. After this, a steady and complete recovery took place.

The case illustrates the gradual progress of the suppuration from one part of the middle ear to the other, especially its different stages in the mastoid. The operation probably prevented its entrance into the posterior cranial fossa, such entrance having occurred in the fatal case (No. 4) of my above-mentioned paper, but the final recovery did not begin before the last focus, in the tip of the mastoid, had been stamped out.

The case furnishes this rule for guidance: *As long as there are grave and protracted symptoms of middle-ear disease, we have to seek for their anatomical cause, in doing which exploratory openings of the cranial cavity are legitimate, because they are practically harmless, and sometimes may save the patient's life.*

A FURTHER[1] CASE OF ANCHYLOSIS OF THE STAPES DIAGNOSTICATED IN LIFE, WITH AUTOPSY AND MANOMETRIC AND HISTOLOGICAL EXAMINATIONS.[2]

By Prof. F. BEZOLD, Munich.

Histological Examination by Dr. SCHEIBE.

(*With three figures on Plate I., Vol. XXVI., Germ. Ed.*)

Translated by Dr. Ward A. Holden.

IN the functional auditory tests as I have performed them for years, gradually perfecting them in various directions, I have had a higher purpose than the mere confirming and refining of the diagnosis of diseases of the ear.

Apart from the difficulty of involving the different parts of the ear in the lower animals by operative procedures, we cannot get satisfactory results from auditory tests with them, but the daily clinical study of ear diseases offers us a wealth of auditory disturbances.

The conditions governing the functional tests of the ear are more favorable than in the case of any other sense organ, since there are two methods of testing, viz., by air- and by bone-conduction, and the results obtained in these two ways may be compared for each tone. The introduction of the continuous series of pure tones has enabled us to analyze the function of the auditory organ completely, and from the characteristic disturbances peculiar to the different changes in the conducting apparatus, and the breaks due to laby-

[1] "A Case of Anchylosis of the Stapes," Arch. of Otol., vol. xxiii., p. 48;
[2] and a paper read at the third meeting of the German Otological Society at Bonn.

rinthine involvement, we have discovered a whole series of partial auditory defects which occur in constant fashion.

In many cases it is also possible to discover the changes which give rise to these defects. The cause of the defects which are due to destruction or fixation of various parts of the conducting apparatus can often be recognized by examining the ear in life, and we can also produce many of the defects by operative procedures, such as removing or disarticulating certain parts, incising the drum membrane, tenotomizing the muscles of the interior, removing the ossicles, etc. When, however, the drum membrane is intact, or when the affection is located in the labyrinth or in the fenestræ, it is only by collecting the records of many autopsies that we are gradually placed in a position to understand what changes produce the defects shown in the functional examination in life.

This is the way and, in my opinion, the only way to build up a physiology of the ear which can give, with our present clinical knowledge, a satisfactory insight into the extraordinary capabilities of the normal organ of hearing.

This course is sufficiently praiseworthy in itself, but it will bring with it a change in the relations of otology to general medicine, and lead to a more general recognition of the importance of otological study.

For years I have collected all the clinical observations that seemed to be of value for physiological purposes. At the third meeting of the German Otological Society I presented a case of bony anchylosis of the stapes with functional examination and autopsy, to which I can now add another similar case.

E. R., a student, aged twenty-four, was seen October 4, 1888. He had been hard of hearing for seventeen years, and there had been continuous tinnitus. A brother and sister were hard of hearing.

The left *Mt* is normal ; the right *Mt* has an atrophic scar in its lower half.

Whisper heard, { right, 6 *cm*, left, 25 *cm*.

The fork A placed on the vertex is perceived in the left ear,

and is heard 15 seconds longer ; a^1 on the vertex is also perceived in the left, the time not noted.

Rinné, with A, was on both sides,—δ.

Rinné, with a^1, { right,—10 seconds, left,—9 seconds.

Lower tone limit: C^{-1} to F^{-1} were not perceived by air-conduction.

The diagnosis was *sclerosis*, with *anchylosis of the stapes*.

As the continuous series of tones had not been employed at this time, it was determined only that the forks C^{-1} to F^{-1} were not perceived by air-conduction. According to all my experience, however, the defect extended still higher. The test with Galton's whistle was not made.

An entirely analogous condition was found two years later in a brother aged twenty-one, who was examined with the continuous series.

Mtt normal, excepting a radial striation of the cone of light.

Whisper heard, { right, 35 *cm*, left, 25 *cm*.

(The hearing distance of the left ear was the same in the two brothers, and therefore a comparison is the more valuable.)

Fork A on the vertex, + 18 seconds.

Rinné, with a^1, { right,—7 seconds, left,—10 seconds.

Upper tone limit, { right, $C\sharp$. left, F.

Upper limit for Galton's whistle, { right, 2.1, left, 2.

Similar tone limits may be assumed for the left ear of the elder brother. For the right, deafer, ear the limits were certainly not so wide.

In both brothers there was found the triad of functional symptoms, which for me is characteristic of fixation of the stapes, viz., lengthened bone-conduction for low tones, marked negative Rinné, and extensive defect in air-conduction at the lower end of the scale. The elder brother had also a large scar in the drum membrane, due to an earlier suppurative process that must have been long healed, since the patient had no recollection of it.

Five years after the examination the elder brother succumbed to a profuse hemorrhage in the course of phthisis, and I obtained both auditory organs.

No further decrease in hearing had been noticed by the patient or his friends in the five years since his examination.

Macroscopic.—Right: The lower half of the drum membrane is occupied by a kidney-shaped scar, sharply outlined, transparent, and level with the remainder of the drum, which has a white opacity in its upper half.

The tympanic cavity is free from secretion and its mucosa is pale, that of the antrum being perhaps more opaque. From the inner surface of the drum membrane the lower end of the handle of the malleus projects as a free process covered with mucous membrane.

The crura of the stapes are of extraordinary delicacy, and the obturator membrane between them is wanting. By means of a sound it is found that the stapes is completely immovable, and the crura break under very slight pressure from in front. The white color of the foot-plate is in contrast with the neighboring wall of the tympanic cavity.

The mastoid region is sclerotic (from the previous inflammation), and the antrum contains only a few cells.

The tube is difficult to catheterize, owing to curvature; and it contains a glassy mucus, but the mucosa is of normal appearance.

On the left side also the tympanic cavity is empty, and the ossicles and mucosa are normal. The exceedingly thin crura of the stapes on this side broke in the dissection. Here also the obturator membrane is wanting. As on the other side the foot-plate is brought into contrast with the surrounding bone by its white color.

Manometric Examination.—A manometric examination was undertaken on the right side before the tympanic cavity was opened, with the following results: Insufflation of air through a tube placed in the auditory canal caused a rise of $\frac{1}{3}$ *mm* in the fluid of the labyrinth manometer, and sucking out the air caused it to fall $\frac{1}{2}$ *mm*. Condensation of the air through the tube caused a rise of 2 *mm*, and rarefaction a fall of 2 *mm*, the small figures being due to the fact that the tube had been injured in removing it and was consequently not air-tight. With the tympanic cavity opened, insufflation and suction in the canal caused no movement of the fluid in the labyrinth monometer, indicating that the motion before the cavity was opened was due to the round window only.

A style 10 *cm* long cemented to the head of the malleus moved outward 1 *mm* when the air in the canal was condensed, and 10½ *mm* inward when it was rarefied. When cemented to the body of the incus it moved ⅛ *mm* and 2 *mm*.

The manometric examination thus showed a complete immobility of the foot-plate of the stapes and a limitation of the movement of the malleus and incus, possibly due in part to the previous suppurative process, but which could be fully explained by the fixation of the stapes.

Histological Examination.—Both temporal bones were decalcified and cut in serial sections, vertical, and perpendicular to the upper edge of the pyramid.

The mucosa of the left side is normal, of the right that on the promontory particularly is thicker, poorer in nuclei, and contains fewer blood-vessels. The epithelium is flatter.

The number of muscular fibres is reduced in the tensor tympani of each side. The stapedius muscle is well developed on the left side and poorly developed on the right. The transverse striations are not well marked at various points in each muscle.

In the malleo-incudal articulation, which was cut on the right side, only the meniscus could be followed through the entire joint. The articular surface of the head of the stapes is unchanged on both sides, and the membrane of the round window is also normal.

Very marked changes were found, however, at the stapedio-vestibular symphysis on both sides. Even with the naked eye one sees in the sections a slight thickening of the bone at the margin of the pelvis ovalis, and a very marked thickening of the foot-plate of the stapes.

The deposit about the pelvis ovalis consists of spongy bone, poor in medulla, and extends in the left ear only through the region of the lower margin, while on the right side it occupies the entire promontory up to the niche of the round window, and involves to a less extent the upper margin of the oval window. There is no sharp line of demarcation between the spongy and the compact bone.

The thickening of the foot-plate is more marked on the right side, and in places it is five time the normal thickness. It includes the entire extent of the foot plate on both sides, but is more excessive in the middle than at the margins. Only the tympanic surface of the foot-plate has been thickened, and this is rough while the labyrinthine surface is smooth. Thus the foot-plate in section has the form of a plano-convex lens with the convexity toward the tympanum.

The periosteum on the tympanic side is much thickened.

The hyperplastic bone, into which both foot-plates are transformed, consists of spongy material with many medullary cavities and some giant-cells. Both in the pelvis ovalis and in the foot-plate, particularly on the right side, there are large lacunæ filled with dense connective tissue. No tubercle bacilli were found.

The cartilage, where it is preserved, is abnormal. Its cells are small, the protoplasm is darker stained, and the nuclei are often wanting.

The foot-plate of the stapes not only touches the margin of the oval window at many points, but is in part united to it by bone. On the right side there is bony union above, while the annular ligament is preserved below; on the left there is a small bony union above. On both sides the adjacent surfaces are broad and uneven, corresponding to the thickening of the foot-plate, so that, even where there is no bony union, motion would seem to be impossible.

Figs. 1 and 2, Plate I, represent a vertical section through the right and left foot-plates, the left cut nearly through the centre, the right cut farther back. Fig. 3 represents a normal foot-plate for comparison.

The cochlea and the remainder of the labyrinth appear normal in so far as the preservation of the elements warrants a judgment.

As the cause of the functional disturbance observed in life we find the same osseous hyperplasia that was present in my previously reported case. In this case the process seems to have run its course, the bone is fully formed, there are few giant-cells, and none of the young osseous tissue that was found in the previous case.

The particular value of this case consists in the localization of the process to the stapes and its neighborhood. On the left side, excepting the pelvis ovalis, the entire organ was normal. And the changes in the drum membrane of the right side are of no great importance, for such changes are found in ears with nearly normal hearing.

Thus, excepting the marked changes at the oval window on each side, there are neither in the tympanum nor the labyrinth changes which could explain the deafness. The autopsy, therefore, leaves us no other course than to believe that the symptom-complex found in life is the functional expression of the changes found at the autopsy in the stapedio-vestibular symphysis.

There are now five ears in which, after making this diagnosis in life, that condition was found at the autopsy. There are also several observations by other authors of stapes anchylosis being found after death when at least negative Rinné has been found in life.

So far as it may be demonstrated in a pathological way, I consider as proven the theory advanced when my first case was published, that whenever the three symptoms mentioned are present in a noticeable degree, the pathological change producing them is a fixation of the conducting apparatus at its most efficient point, viz., the oval window.

The effect of this fixation on the complicated lever apparatus represented by the chain of ossicles with the drum membrane and the annular ligament, is a purely mechanical one, and it is indifferent whether this is brought about by ossification in the stapedio-vestibular symphysis, by calcification of the annular ligament, by adhesions of the foot-plate of the stapes, or by analogous processes between the crura of the stapes and the wall of the pelvis ovalis.

A very important paper by Politzer, "Primary Disease of the Labyrinth Capsule," these ARCHIVES, 1894, p. 255, appeared after the above paper was in print. He confirms the results of my examinations, and the paper is also highly instructive on other points.

FIFTH INTERNATIONAL OTOLOGICAL CONGRESS, HELD IN FLORENCE, SEPTEMBER 23 to 26, 1895.

REPORTED BY T. BOBONE, OF SAN REMO.

Translated by Dr. A. B. KIBBE, Seattle, Washington.

The reception took place September 22d, at the residence of Prof. Grazzi.

The sessions were held in the Istituto degli Studi Superiori.

FIRST DAY'S SESSION, MONDAY, SEPTEMBER 23D, 10 A.M.

Presiding Officer : PROF. GRAZZI.

Members Present :

1 *Arslan*, Padua.
2 *Avoledo*, Mailand.
3 *W. W. Baldwin*, Florence.
4 *Barr*, Nice.
5 *Benni*, Warsaw.
6 *Bianco*, Turin.
7 *Bobone*, San Remo.
8 *Boucheron*, Paris.
9 *Brieger*, Breslau.
10 *Bronner*, Bradford.
11 *Browne, Walton*, Belfast.
12 *Brunetti*, Venice.
13 *Buscaroli*, Imola,
14 *Capart*, Brussels.
15 *Chiucini*, Rome.
16 *Coldstream*, Florence.
17 *Conopelo*, Vienna.
18 *Coosemans*, Brussels.
19 *Corradi*, Verona.
20 *Cresswell-Baber*, Brighton.
21 *D'Aguanno*, Palermo.
22 *Daly*, Pittsburg.
23 *Damato*, Naples.
24 *Damieno*, Naples.
25 *Delie*, Ypres.
26 *Delstanche*, Brussels.
27 *De Roaldes*, New Orleans.
28 *Dundas Grant*, London.
29 *Ferreri*, Rome.
30 *Ficano*, Palermo.
31 *Galetti*, Milan.
32 *Gellé*, Paris.
33 *Goris*, Brussels.
34 *Garzia*, Naples.
35 *Gouguenheim*, Paris.
36 *Gradenigo*, Turin.
37 *Grazzi*, Florence.
38 *Heiman*, Warsaw.

39 *Helme*, Paris.
40 *Kirchner*, Würzburg.
41 *Knapp* (*Arnold*), New York.
42 *Krzywicki*, Königsberg.
43 *Locatelli*, Pesara.
44 *Lubet-Barbon*, Paris.
45 *MacNaughton-Jones*, London.
46 *Madeuf*, Mont Dore.
47 *Martin*, Paris.
48 *Masini*, Genoa.
49 *Moltisanti*, Syracuse.
50 *Mongardi*, Bologna.
51 *Morpurgo*, Trieste.
52 *Moure*, Bordeaux.
53 *Numa-Campi*, Livorno.
54 *Okuneff*, St. Petersburg.
55 *Palozzolo*, Agira.
56 *Pietkowski*, Radoin.
57 *Politzer*, Vienna.
58 *Putelli*, Venice.
59 *Rici*, Savona.
60 *Rutten*, Nemours.
61 *Secchi*, Bologna.
62 *Secretan*, Lausanne.
63 *Semon*, London.
64 *St. Clair Thompson*, London.
65 *Steele*, Florence.
66 *Stone*, Liverpool.
67 *Suñe y Molist*, Barcelona.
68 *Szenes*, Budapest.
69 *Urban-Pritchard*, London.
70 *Verdos*, Barcelona.
71 *Zapparoli*, Mantua.

Professor GRAZZI opened the Congress with a pleasant speech of welcome, deplored the loss of such prominent colleagues as Professor Moos, Sapolini, Longhi, von Tröltsch, Joly, Helmholtz, and Tofoni, and declared the Fifth International Otological Congress opened.

Professor POLITZER spoke in memory of Professor Moos, lately deceased.

Professor Grazzi was elected President, and Drs. Benni, Bobone, Cresswell-Baber, and Chiucini Secretaries to serve during the Congress.

SECOND SESSION, MONDAY, SEPTEMBER 23D, 3.30 P.M.

President: PROF. GRAZZI.

GELLÉ, Paris: **The General Treatment of Diseases of the Ear.**—In diseases of the ear which so often occur in connection with constitutional or hereditary syphilitic, or still more often with infectious conditions, general treatment is indispensable. Prophylaxis was first discussed by calling attention to the many ways of infection in the fœtus, the infant, and the child.

Heredity was then taken up, the infectious processes in the mother during pregnancy, errors in hygiene, and in dietetics, all causes of intestinal inflammation in children, and of atrophy and suppuration. How frequently the ear reacts with a suppurative inflammation under these circumstances is well known.

The speaker then reviewed the general treatment of *otitis acuta.* Such treatment may in the beginning be abortive, particularly in cases of *oto osteoperiostitis infectiva*, such, for example, as occur in connection with influenza when general treatment, although not markedly successful, is still not useless. The various indications in *otitis grippalis*, *otitis rheumatica*, *guttosa*, etc., were fully treated.

The general treatment in *otitis media chronica* must be based on its etiology ; tuberculosis, scrofula, syphilis, diabetes, cachexia, pregnancy, etc.

The next portion of the paper was devoted to the general treatment of cases of *otitis chronica*, characterized by attacks of dizziness. Here the indications are to modify the irritability of the nerve centres and the labyrinth. Those forms which present subjective disturbances of hearing must be grouped under a particular clinical type, and may be treated by various general internal as well as external means. The last chapter was devoted to hardness of hearing in general. Here the treatment by suggestion, hypnotism, and electricity was mentioned.

In all forms of ear disease it remains certain that local treatment is of prime importance, while general treatment, though not to be undervalued, must always remain secondary.

ARSLAN, Padua.—**Adenoid Vegetations.**—In connection with the opinion expressed by Gradenigo and Corradi, Arslan maintained that adenoid vegetations were more frequent in Italy than was generally believed. Among 4080 patients affected with disease of the ear, nose, or throat, adenoid vegetations were found 426 times, or in 10.7 per cent. As far as the etiology is concerned the author was of the opinion that the damp climate was not of such great importance. Dyscrasia and heredity play a more important role.

The various complications were then reviewed, which the author divided into two groups. The first included diseases of the ear, inflammation of the upper air-passage, and nose-bleed ; the second, reflex symptoms. Treatment was extensively described. Brief anæsthesia with bromide of ethyl, rapid removal of the growths in one sitting when possible. The instrument used was usually Moritz Schmidt's knife.

Discussion.—CORRADI and GORIS recommended Gottstein's curette and anæsthesia.

HELME said that prior to the age of fourteen cocaine should not be used, as it did not repress the patient's fright. The effect of

bromide of ethyl is too short. The introduction of the finger into the post-nasal space might produce infection.

GRADENIGO observed that the method of the operator cannot always be the same. In children who have never been operated on, the operation may be made without an anæsthetic. He preferred chloroform to bromide of ethyl; after the operation douching is unnecessary as the blood is really the best antiseptic.

PRITCHARD operates under anæsthesia produced by inhaling a small amount of ether mixed with a special gas [what the special gas is the original report does not state. TR.]. He uses an antiseptic solution as a wash.

MOURE expressed the opinion that anæsthesia is indispensable in many cases. Complete removal of the vegetations is not necessary; only those should be removed which prevent free breathing or interfere with the functions of the tubes.

SECRETAN called attention to the frequency of adenoid vegetations in Switzerland.

DUNDAS GRANT uses nitrous oxide as an anæsthetic, begins the operation with the finger and completes it with either scoop or forceps.

BOBONE believes adenoid vegetations occur in Italy fairly frequently, but not on the sea-coast. He had seen very few cases on the Riviera.

OKUNEFF.—**Auscultation of the Sclerosed Mastoid.**—The method consists in placing on the mastoid a small vibrating tuning-fork, which is connected with the (examiner's) ear by aid of a rubber tube. Varying thickness of the bone produces variations in the sound of the fork.

Discussion.—MORPURGO had repeated Okuneff's experiment, but arrived at no positive results.

AVOLEDO.—**What results have been produced on the deafness accompanying suppurative inflammation of the middle ear by intratympanic surgery?**

Discussion.—FICANO asked whether the improvements enumerated by Avoledo were to be looked upon as really the results of removal of the drumhead and extraction of the hammer, or whether they were not more likely due to the traction on the stapes which ruptured the adhesions between the foot-plate and the fenestra ovalis.

POLITZER fails to find in Avoledo's address any mention of the intratympanic operations in the region of the inner wall of

the tympanum, which for acoustic results are more effective. He had reference to cutting the cicatricial bands which lie between the foot-plate and the fenestra ovalis, as well as those which often bind the hammer to the inner wall of the drum cavity. Similar results are also obtained by resection of the posterior fold.

GRADENIGO desired to be better informed on one point. It appeared that Avoledo had spoken of acute middle-ear suppuration producing complete deafness in a few days. He was of the opinion that in such cases the patients were very nervous, syphilitic, or tuberculous.

MORPURGO.—Intratympanic operations made for acoustic purposes may cause a return of the suppuration; the extraction of the incus is not seldom followed by facial paralysis. Conservative treatment often gives unexpected results.

GELLÉ mentioned the sequelæ which often follow surgical operations in the drum cavity, and which are often evidence that the disease lies in the terminal cells of the mastoid.

DUNDAS GRANT had often seen undoubted improvement after a complete loosening of the posterior ligament of the hammer, whereby a more complete washing out of the cavity and removal of cholesteatomatous masses were possible.

MOURE remarked that disease of the upper anterior part of the tympanum often depends on caries or necrosis of the hammer, which should be extirpated.

DELSTANCHE also observed that in disease of the attic extraction of the hammer, combined with washing out the cavity and cauterizing with solutions of zinc chloride, often cured the otorrhœa. In exceptional cases only was he forced to extract the incus or open the mastoid.

COOSEMANS.—**A Case of Horn of the Auricle.**

THIRD SESSION—TUESDAY, SEPTEMBER 24, 9 A.M.

President: PROF. POLITZER.

GRADENIGO.—**The General Treatment of Otitis Interna.**—The author was of the opinion that specialists neglected to be biologists, physicians, and surgeons, and have overlooked the connection between the ear and the organism in general.

As a consequence our reliance was for years placed solely on the air douche. The discovery of the connection between diseases of the ear and those of the pharynx gave the assistance of surgery to our therapeutics. By his discovery of adenoid vegetations,

Meyer gave to otology a great impulse, which was completed by a knowledge of the pathology of the temporal bone. The otologist is not yet however sufficiently a physician. It is the diseases of the inner ear particularly which may be influenced by general treatment. Otitis interna may be hereditary or acquired. The acquired form is often associated with either syphilis or rheumatism. In the syphilitic form early treatment often gives brilliant results, particularly the internal use of iodides and intra-muscular injections of mercury. In the rheumatic form general treatment is of little or no avail. Hydrotherapy, by increasing the resistance of the cutaneous system and diminishing the frequency of inflammations of the naso-pharynx had given the best results in connection with local treatment. The prognosis of otitis interna consecutive to otitis media in consumptives is always bad. Improvement is only possible when the general condition improves. Good results had been obtained in trade-labyrinthitis by the use of iodides. Patients suffering from otitis interna of hereditary origin, Gradenigo divides into three classes: 1. Tubercular, or those coming from tubercular families. 2. Syphilitics. 3. Those in whose family analogous forms of otitis exist. In the first two groups heredity must be considered in the sense that here the organism possesses a diminished resistance to the pathogenic cause. Here internal treatment has not fulfilled our hopes. In the syphilitic form specific treatment improves but does not cure the condition. In the tubercular, long-continued administration of the iodides is followed by some but very slight results.

Discussion.—Morpurgo spoke briefly of the advantages of the air douche, and with von Tröltsch was not afraid of the entrance of micro-organisms into the drum cavity. As far as general treatment was concerned all methods were uncertain, excepting the specific treatment of syphilis.

Brieger.—**Primary Ostitis of the Mastoid.**—The writer reported a case of acute disease of the mastoid, with, in the beginning, an evanescent collateral participation of the drum cavity, in which the form described by Bezold of a perforation through the incisura mastoidea developed. The operation, two months after the onset of the disease, showed beneath thick intact cortex a cavity of the size of a walnut, containing granulations, a small amount of pus, and a sequestrum still showing diploïc quality. On the under surface a thin, broad scale of perforated bone still remained. In addition, a gravitation abscess was present beneath

the sterno-cleido-mastoid. The drum cavity had remained free after the disappearance of the exudation which it contained at the onset of the disease. It is very rare for a true ostitis of the mastoid to develop in connection with infectious diseases. In typhoid only, according to his experience, is there a possibility of the development of primary ostitis of the mastoid. In diabetes also it is highly improbable.

The rarity of primary tuberculosis of the mastoid, as well as the difficulty of its recognition, was also referred to. It is usually very difficult, occasionally impossible, to demonstrate the presence of tubercle bacilli in the granulations or pus.

FOURTH SESSION—TUESDAY, SEPTEMBER 24, 3.30 P.M.

President: PROF. GELLÉ.

CORRADI: **Traumatic Perforations of the Drumhead from Indirect Cause Viewed Particularly from a Medico-Legal Standpoint.**—Corradi reported in brief the various causes of indirect perforation of the drumhead. In cases where compression of the air in the external meatus had taken place, the author had come to conclusions which coincided with those of Politzer, but the form and locality of the perforation produced by a kick or blow upon the head vary if associated with a fracture of the bony parts. In cases where no bony fracture is present the perforation lies at the periphery of the drumhead. The conditions which make the perforation possible in the latter cases, are a condition of tension of the drumhead produced during life by a contraction of the oto-muscular apparatus and favored by the presence of alterations such as dry and hyperplastic forms of catarrh, or in addition atrophy or cicatrices of the drumhead near its periphery. The author reports three cases where such a perforation occurred. They are, however, rare, and always imply the action of a certain amount of force. From this it is possible, according to the location of the perforation, to state the mechanism of its origin which is of importance from a medico-legal standpoint. In the discussion Politzer remarked that the author had forgotten an important symptom which was valuable for differential diagnosis between recent perforations and old ones originating in suppurative processes. In the first, the borders of the wound are covered with blood and by Valsalva's method the air passes easily into the external meatus, while in

pathological perforations the air makes its exit only under greater pressure and produces a whistling sound.

FERRERI: **Changes in the Middle-Ear in Old Age.**—Ferreri made 201 experiments on aged persons in order to determine whether or no the hardness of hearing, which often accompanies old age, arose from a hyperplastic otitis media or from an involution process. For this purpose he had in addition made an anatomical examination of the temporal bones of two persons aged respectively ninty-two and one hundred and twelve years, and demonstrated that in them the deafness was a consequence of an otitis media hyperplastica which had resulted in a deformation of the stapes, increase in volume of its head and crura, and a bending of the foot-plate. The bone in addition was atrophic. In the majority of the cases in old age we find a condition of gradual diminution of hearing progressing to complete deafness with no, or but slight, changes. (Atrophy of the membrane, ceruminal plugs, sclerosis peritympanica, dryness of the meatus.) As far as the function of the acoustic nerve is concerned, the author presented seven tables giving the results of numerous tuning-fork examinations, the results of which are as follows:

In old age bone-conduction is preferably through the right ear while air-conduction takes place through the left. In 201 individuals only twenty-one were absolutely free from lesions of the labyrinth. It appears that hearing for the watch is better than for whispered speech. Elderly persons with healthy ears are more numerous than those with diseased ones. The conclusions to be drawn from these statements are that the causes of deafness in old age according to their frequency are collections of wax, the hyperplastic form of middle-ear catarrh, the consequence of suppurative inflammation of the middle-ear, chronic suppurative inflammation of the middle-ear, and, finally, the rare lesions of the acoustic nerve. In the discussion GRADENIGO was of the opinion that in old age where examination revealed no lesion there was great probability that an involution process existed as well of the middle ear as of the acoustic epithelium. POLITZER did not agree with Ferreri inasmuch as in accordance with his observations the majority of the cases showed an ossification of the labyrinthine capsule. MASINI denied the existence of an involution process as a cause of the slight hardness of hearing in old age.

BARR: **Suppuration of the Middle-Ear and Mastoiditis after a Mastoid Operation During an Epidemic**

of Influenza.—A few days prior to the operation the patient had used a nasal douche of a four per cent solution of boric acid. The operation was performed under bromide of ethyl narcosis with Löwenberg's forceps and Gottstein's curette. Following the operation aristol was used. The inflammation of the drum cavity began three days later. That of the mastoid on the following day. The author is of the opinion that during such epidemics the operation is not to be advised.

DELSTANCHE: **Fluid Vaseline in the Treatment of Middle-Ear Disease.**

The good results published by him of intra-tympanic injections of fluid vaseline had been substantiated by numerous authors. He replied to the objections of Alt, who had understood him to mean that the injections must replace paracentesis of the drum-head. He had only stated that in cases where paracentesis gave but passing results vaseline injections were to be preferred. In opposition to Alt he praised the good results of simple or iodoform vaseline in acute otitis media purulenta, which often had a pronounced abortive action. He injects three or four grammes. The vaseline must be pure, colorless, without odor, and sterilized. The addition of iodoform is only necessary in infectious otitis media. SECRETAN injects only $\frac{5}{10}$ *cc* of vaseline and saw good results in otitis acuta, less in chronic and sclerotic forms. SUÑE Y MOLIST held that large amounts were unnecessary. He injects but six to eight drops. GRANT used the intra-tympanic probe. He was enabled in this way to lessen adhesions and produce marked and rapid improvement. BRIEGER had found Delstanche's method very useful in numerous cases of dry middle-ear catarrh. POLITZER called attention to the fact that in pure sclerosis, where proliferation of bony tissue existed in the labyrinthine capsule, and in stapes anchylosis, etc., all treatment is useless. In chronic catarrh of the tympanum, with adhesions between ossicles and the inner wall of the drum cavity, the injections, according to Delstanche, produced more or less improvement.

MCNAUGHTON-JONES: **The Relation of Hypertrophy of the Turbinated Bodies to Hardness of Hearing, with Particular Reference to their Removal.**

He had made collective investigations in reference to the question of the influence of turbinated hypertrophy on hearing and the best treatment for the same. The answers conveyed the impression that the English otologists were generally of the opinion

that these hypertrophies very frequently accompanied deafness and tinnitus, and, if not a cause of the deafness, nevertheless increased it and lengthened its duration. Observations of the author gave as a result that in 300 cases of diseases of the ear the turbinates were hypertrophic in but 69, while in the remaining 231 no hypertrophy or other cause of nasal obstruction was present.

As far as treatment was concerned the majority of those questioned believed that the galvano-cautery, as well as cauterizing with chromic or trichlor acetic acid, was to be preferred to the removal of the turbinates. The author concluded that the turbinates should only be removed where the nature and size of the hypertrophy was such that other measures were useless. In discussion DUNDAS GRANT remarked that he did not remove the turbinates to improve the hearing, but to relieve the nasal obstruction.

FIFTH SESSION, WEDNESDAY, SEPTEMBER 25TH, 9.00 A.M.

President: DR. DELSTANCHE.

KIRCHNER: **Sarcoma of the Mastoid Process.**

The case was one of myelogenous sarcoma occurring in a man forty years of age who many years before had suffered from a suppurative inflammation of the middle ear. In a short time the neoplasm produced a softening of the bone so widespread and to such an extent that in the autopsy the temporal bone was removed *in toto* with the knife. It originated primarily in the cells of the mastoid process and from here extended towards the drum cavity and still farther inward. A few weeks before death the patient complained of pain in the back of the head, and the mastoid process was sensitive to pressure. After opening this bone a tumor the size of a pigeon's egg was found just beneath the cortex, which could be followed with the probe to a depth of 5 *cm.* As the whole squama was movable the tumor was not removed. Microscopic examination showed the large cells of the bony marrow surrounded by spindle cells.

Discussion.—FERRERI called attention to the fact of having published two cases of epithelioma of the mastoid process and praised the value of capillary puncture for diagnostic purposes. GRADENIGO had observed a sarcoma originating in the periosteum of the mastoid process. The ear was quite sound. BRIEGER,

GELLÉ, and MOURE saw two cases of primary sarcoma of the middle ear where glandular swelling, as well as facial paralysis, occurred very late. The earliest and most prominent symptom was pain. POLITZER had reported a case of sarcoma of the mastoid process which had extended to the drum cavity, perforated the tip of the cochlea, and entered the cranial cavity through the meatus auditorius internus.

SUÑE Y MOLIST made some observations on the frequency of osteosarcoma of the mastoid process in Spain which puncture the cerebral cavity, compress the cerebellum, and as symptoms of such compression cause pain in the back of the head, giddiness, and coma.

THOMAS BARR: **The Treatment of Intracranial Abscesses Consequent on Suppurative Inflammation of the Ear.** (Published in full in the last number of these archives, partially read by U. PRITCHARD).

In connection with the paper read by him at the Fourth International Otological Congress the author was of the opinion that good results might be expected from operative procedure in the following cases:

1. Cerebral abscess, particularly of the tempero-sphenoidal lobe.
2. Cerebellar abscess.
3. Epidural abscess.
4. Infectious thrombosis of the sigmoid sinus.

He is also of the opinion that it is necessary in the operation to first open the cavities of the middle ear. The opening of the skull is best made with the dentist's burr, then completed with the chisel. Extradural abscesses may be the forerunners of temporo-spehnoidal abscesses, and if they lie in the vicinity of the sigmoid sinus may produce septic thrombosis of the same, general septicemia or cerebellar abscess. Operative procedure in cases of epidural abscess are particularly successful. During the last seven years thirty-nine cases with thirty-nine cures have been published. In cases of sinus-thrombosis accompanied by septic symptoms the occlusion of the sinus is the first indication for the operator. It is of first importance to prevent further infection. This occlusion is accomplished by tying the jugular in the neck or by opening the sinus, emptying it and tamponing with iodoform gauze (MACEWEN.) If the symptoms point to a cerebro or cerebellar abscess no time is to be lost. The cavity should be emptied

with a canula, a trochar or aspirating needle and disinfected. In the treatment of such cerebral or cerebellar abscesses the cortex above the ear is opened by aid of the trephine, or in cases cerebellar abscess the opening is made back of the sinus. The diagnosis of the mixed forms of cerebral abscess which are complicated with pachy- or lepto-meningitis or with sinus-thrombosis is often extremely difficult. In all cases we shall do well, where severe cerebral symptoms exist in connection with chronic inflammation of the middle ear, not to wait too long but to explore all ways by which an extra- or epi-dural collection or a cerebral or cerebellar abscess might originate.

GRADENIGO: **A Contribution to the Intracranial Surgery of the Complications of Otitis.**

Although still difficult at the present time the diagnosis of intracranial complications after otitis media may be made in many cases with certainty. These complications are often observed. The author in the last year has seen in sixty-eight cases of mastoiditis these complications occur fourteen times (17.6 per cent.) including five extradural, two cerebral, and three cerebellar abscesses, two cases of meningitis and two of sinus-thrombosis. Eleven cases were operated on with three deaths (two from meningitis and one from cerebellar abscess), and nine recoveries. The diagnosis of meningitis is the most simple. Then that of sinus-thrombosis. The aphasic and amnesic symptoms assist greatly in cases of left sided cerebral abscess. As far as the technique of the operation is concerned the author distinguishes between urgent and non-urgent cases. In the latter it is better to first open the cavities of the ear. In the former, operation on the squamous portion is to be preferred. In cases where severe symptoms indicate the necessity of operation and the necessary data for the diagnosis of an abscess are wanting, the author recommends to first open the mastoid widely and then lay bare the sinus and the cerebral and cerebellar dura. The exploration of the brain may be made with a trocar not exceeding 3 *mm* in thickness which should not be introduced to a depth exceeding 3 *cm.* If this exploration results negatively the dura may be incised and the brain penetrated with the knife.

Discussion.—URBAN PRITCHARD expressed the opinion that in small towns where there were no good surgeons the otologist may undertake the operation. He considered it better to always open the skull. In sinus-thrombosis the posterior edge of the

coagulum should be removed sufficiently to reach the blood stream when it should be tamponed. In operating he uses chisel and gouge ; only in the case of a sclerosed mastoid does he prefer the trephine.

BOBONE, in connection with the previous paper, reported the following case which speaks for the possible difficulties in diagnosis : The patient exhibited fever, dizziness, disturbance of equilibrium, pain in the centre of the head, left sided facial paralysis, constipation. No vomiting. Cerebral abscess was diagnosed. The operation was made by a surgeon. The completely sclerosed mastoid was opened and the sinus bared. As the latter was healthy, and no pus found anywhere the operation proceeded no further. The patient died twenty days later. The autopsy revealed diffuse meningitis, left-sided encephalitis and an extradural abscess the size of a pigeon's egg *on the right side.*

POLITZER called attention to the cases where in spite of very pronounced symptoms no abscess is present and to those where the abscess remains latent. He reported one case in which after an operation pronounced improvement took place, followed by death six days later. At the autopsy a second abscess was found posterior to the first.

BRIEGER operated on a case of sinus-thrombosis in which all symptoms disappeared after the operation. In another case accompanied by the same symptoms the operation gave only a temporary result, the patient dying later on. At the autopsy the sinus-thrombosis of the *opposite* side was found. The author considered the prognosis in extradural abscess as absolutely favorable. The results in sinus-thrombosis are probably better than in cerebral abscess ; with reference to treatment he was of the opinion that, though the chiselling upon the skull might favor the emptying of the abscess into the lateral ventricle, nevertheless he preferred the hammer and chisel to the trephine. In reference to the prognosis he observed that even in cases when the operation gave the best results it is not possible to estimate the final outcome with certainty.

GORIS, MORPURGO, CRESSWELL BABER also participated in the discussion.

BENNI.—**Report on the Baron Lenwal Prize.**—Considering the absence of opposition, the following will be substituted with Baron Lenwal's permission. The interest on the 3000 francs which has accumulated in the interval between two

Congresses will be given to the author of the most marked progress in practical treatment of diseases of the ear, or to the discoverer of a new light and portable apparatus for the improvement of hearing.

HEIMAN.—**A Case of Otitic Cerebellar Abscess.**—This is the seventh case coming under Heiman's observation. The early symptoms were those of meningitis, high fever, pain in the occiput, nausea; then followed giddiness, retraction of the head, numerous and involuntary evacuations, irregularity of the pupils, slowness of speech; still later, diminution of vision, disturbances of the head, occasional vomiting, hyperesthesia of the skin, loss of memory, ptosis of the right upper eyelid, hemiparesis of the facial (right); at a still later stage, hemiparesis of the left extremities and choked disc. The patient had suffered for some time from right-sided otorrhœa. From these symptoms Heiman diagnosed an abscess of the right cerebellar lobe. In spite of all these data the hospital surgeons believed the abscess to be in the tempero-sphenoidal lobe and operated in this direction, naturally without result. After a time the speaker repeated the operation, following the indications of his diagnosis. The mastoid process was widely opened and the greater portion of the upper and posterior wall of the external meatus was removed. On account of the weakness of the patient further procedure became impossible. In spite of this he improved for a short time, but finally died. At the autopsy four cysts of the size of lentils were found in the gray substance of the temporal lobe. The right lobe of the cerebellum and the vermiform process were filled with green fluid, foul-smelling pus. The wall of the abscess formed a capsule 1 *m* in thickness. The speaker was of the opinion that in this case diagnosis presented no obscurity. It was based upon occipital pain, vomiting, and the disturbances of co-ordination of the head.

ST. CLAIR THOMPSON.—**Antisepsis and Intranasal Treatment.**—As the interior of the nasal cavity is practically aseptic, antisepsis is not necessary. The presence of any form of foreign body in the nasal cavity stimulates the secretion of the mucous membrane. It is therefore advisable, with few exceptions, to refrain from any form of antisepsis. With reference to the removal of masses of pus from the nasal cavities, the use of a slight alkaline douche is the best that can be done. Most essential is the thorough disinfection of fingers and instru-

ments. Every instrument may be considered as sufficiently aseptic which has been washed in a five-per-cent. solution of carbolic acid and kept in a case having glass windows. Prior to every operation the instruments should be again washed in the same solution. The art of antisepsis consists in attention to the smallest details.

SIXTH SESSION, WEDNESDAY, SEPTEMBER 25TH, 2 P.M.

President: URBAN PRITCHARD.

Discussion of the address of ST. CLAIR THOMPSON.

In connection with the experiments made by himself in association with LERMOYEZ, HELME stated that their method was practicable and but slightly complicated. Its object was to prevent entrance of pathogenic germs.

GRADENIGO observed that if one operates on an unhealthy nasal mucous membrane, the wound becomes covered with an exudate or a suppurative infiltration. Here energetic antiseptic treatment is not capable of preventing the suppuration and often times general reaction.

BRIEGER and CRESWELL-BABER consider the aseptic treatment of the nasal mucous membrane impossible. They make use of a wash composed of a 7 to 1000 salt solution.

DUNDAS GRANT said that where the nasal mucous membrane is normal, antisepsis is superfluous. In cases where the mucous membrane secretes he applies aristol.

DALY prefers a 1 to 5000 sublimate solution, particularly after operations. He also uses aluminium tubes, which are wound with Brun's cotton dipped in a solution of eucalyptus and benzoin, and introduced into the nose as a tampon.

ST. CLAIR THOMPSON replied that it was absolutely unnecessary to boil instruments, and called attention to the large English clinics where in laparotomies the instruments are treated according to the method above described.

POLITZER.—**The Present Status of the Pathological Anatomy of the Labyrinth.**

After an historical review of the pathological anatomy from which our knowledge of the pathological anatomy of the labyrinth originates, he proceeded to a discussion of the pathologico-anatomical changes which he divided into three categories: first, hyperemia; second, blood extravasations; and third, primary and

secondary inflammations of the labyrinth. Hyperemia is easily recognized anatomically. The vascular supply of the labyrinth is to-day well known. As a frequent cause of hyperemia are to be considered obstructions to the return of venous blood from the labyrinth to the cranial cavity (*e.g.*, cerebral tumors), and next are disturbances in the action of the sympathetic, and chronic inflammation of the tympanum. Hemorrhages in the labyrinth occur most frequently in infectious diseases and in diseases of the heart and lungs. Circumscribed hemorrhages and larger extravasations of blood have been observed in various portions of the labyrinth. Knapp and the writer have seen such labyrinthine hemorrhages in chronic suppuration of the tympanum complicated with caries. The hemorrhages demonstrated by Moos and Steinbrügge in pachymeninigitis hemorrhagica are very interesting. Slightly better known than the previous affections are the inflammations of the labyrinth. The consequences of primary inflammation are but little known and of the initial lesions we know absolutely nothing. The author demonstrated before the International Congress at Mailand the first case of primary inflammation of the labyrinth. Those alterations of the labyrinth occurring in connection with infectious diseases are in general due to an invasion by specific microbes or of pus. Moos was the first who demonstrated this fact, particularly in measles. The alterations of the labyrinth in cerebro-spinal meningitis always occasion particular interest. Heller was the first to demonstrate pus in these cases and at the present time the penetration of pus through the aqueducts of the labyrinth, particularly of the aquæductus cochleæ which is in immediate connection with the cerebro-spinal space, has been completely demonstrated. The changes vary according to the stage of the principal disease. In the early stages suppurative inflammation is more prominent, while in the later stages all the consequences of inflammation appear (atrophy, disturbances of the membranous portions of the acoustic branches, deformation of Corti's organ, fibrous new formation and ossification). The writer then considered the frequency of inflammations of the labyrinth occurring in the course of chronic inflammation of the middle ear which arise from the entrance of pus through the round window or from its being transported through the blood or by way of the lymph spaces. A form of exudation in the labyrinth which is at the present time but little known is caused by an obstruction in the meatus audi-

torus externus producing a compression of the blood vessels. In a case observed by the author (carcinoma), the exudation in the labyrinth consisted of a granular mass lying partly upon the covering of the cochleæ, partly upon the lamina spiralis. The author further considered the changes in leucæmia and in syphilis. In the former they consisted of new formed connective tissue or ossification in the scala tympani and semicircular canals, collections of lymph cells in the interior of the semicircular canals, in the vestibule, etc. In the latter, narrowing of the labyrinth spaces through hyperostosis of the temporal bone, atrophy or destruction of the ganglion cells and of the acoustic fibres, alterations of the blood vessels (Kirchner), thickening of the periosteum of the vestibule, fibrous and often calcareous formations (Moos). Primary labyrinthine tuberculosis has not as yet been observed. Of many secondary lesions tissue-necrosis and fibrous formation in the cavities of the labyrinth are most prominent. In conclusion the writer described ossification of the labyrinthine capsule and depression of Reissner's membrane, first observed by Steinbrügge.

MOURE.—**Cavernous Angioma of the Ear.**—Moure removed the tumor from a woman 47 years of age who complained of headache and hemorrhage from the right ear, with slight discharge. The tumor, which was the size of a bean and non-pulsating, was removed with a cold snare. Immediately following its removal hemorrhage so copious ensued that tamponing the meatus with iodoform gauze became necessary. The point of implantation of the tumor was on the upper and posterior portion of the tympanic cavity. Anatomical examination showed the tumor to be formed by a wall surrounding a closed space. Under the microscope the wall showed itself to be composed of three layers of cells, one layer composed of connective tissue and infiltrated with small nodules and numerous cavities lined with endothelium. The central cavity was in all probability a dilated vessel.

SUÑE Y MOLIST.—**Some Peculiarities of Gunshot Wounds in the Mastoid Region.**—In Spain, where pistols and revolvers are still resorted to on slight provocation, gunshot wounds of the mastoid region are not rare. The results of such wounds are as follows :

1. The bullet causes a comminuted fracture of the bone.

2. It penetrates but a short distance and falls to the floor of the cavity or can be removed with ease.

3. Cerebral or labyrinthine concussion.

SEVENTH SESSION, TUESDAY, SEPTEMBER 26TH, 8 A.M.

President, PROF. KIRCHNER.

MASINI.—**The Influence of Lesions of the Ear Upon Respiratory Exchange.**—The question was studied by the writer in connection with Polimanti by experiments made upon pigeons. The fowls were kept several days on the same diet (25 grammes of beans) after which they were placed in Fredericq's respiration apparatus where the normal amount of $C O^2$ expired was estimated. The semicircular canals or the cochlea were then removed. Where the semicircular canals were removed a marked diminution of the amount of $C O^2$ expired was observed, while in the cases where a lesion of the cochlea had been made the amount remained almost unchanged.

SZENES.—**Traumatic Lesions of the Auditory Meatus.**

HEIMAN.—**Statistics of Ear Diseases.**—The basis of Heiman's statistics were the diseases of the ear which he had treated in a military hospital, and such young persons as he was called upon to examine with reference to their suitability for military service. He had studied the four following points :

1. The frequency of diseases of the ear between the ages of twenty-one and twenty-five.
2. The mortality.
3. The frequency of disease in various portions of the ear.
4. The therapeutic results.

As far as the frequency of ear diseases was concerned he found it to be 8.74 per cent. The mortality from diseases of the ear relative to the general mortality of the hospital was 1.78 per cent. Supported by the data so obtained the writer believed, in opposition to other authors, that one can estimate the mortality in diseases of the ear. This varies from $\frac{3}{10}$ to $\frac{5}{10}$ of one per cent. in diseases of the ear in general, and from 2 to $4\frac{1}{2}$ per cent. in cases of inflammation of the middle ear.

GRAZZI.—**A case of Complete Deafness following Acute Meningitis due to Fraenkel's Diplococcus.**—The patient was a child four years of age who remained completely deaf and dumb after a severe meningitis. The bacteriological examination made in the pædiatric clinic showed the pathegenic agent to have been Fraenkel's diplococcus. GRADENIGO was of the opinion that this case presented a highly interesting point of view as unsettling the question of primary labyrinthitis as understood by Volto-

lini. In an epidemic of cerebro-spinal meningitis Gradenigro often saw these forms of deafness accompanied by symptoms of fever.

BRIEGER remarked in addition that the casual connection between meningitis and the finding of pneumococci has not been demonstrated, as Fraenkel's diplococcus belongs to those bacteria which inhabit the healthy nose.

D'AGUANNO.—**On the Etiology of Paracusis Willisii.**—The writer reported a case in which the cause of the paracusis was to be sought for in the drum cavity and chain of bones. In fact the functional examination demonstrated that the acoustic nerve was perfectly intact, while chronic catarrh of the tympanum and diminished mobility of the ossicles were present.

VERDOS.—**The Disturbances of the Ear Occasioned by Explosions of Dynamite.**—The anarchist riot in the theatre at Barcelona in 1893 gave the writer an opportunity to study the disturbances of the ear produced by explosions of dynamite. They manifested themselves differently according to the distance of the persons during the explosions, being located in the external and middle ear in persons near the explosion and more in the inner ear in persons distant from it.

LUBET-BARBON.—**Localized Inflammations of the Temporal Bone and their Relations to its Anatomical Development.**—The writer reviewed the mode of development of the temporal bone, and called attention to the presence in adults in 5 per cent. of the cases of the fissure mastoidea squamosa as demonstrated by Kirchner, and to the frequency with which one observed the point of union of the os tympanale with the squamous portion and the mastoid process, and observed, in addition, that very often in cases of ostitis of the temporal bone the inflammation remains localized in one of the parts which in the fetus are separate. In this way the writer explains some facts which by others are considered in a different way. The connection between exfoliation of the os tympanale and hereditary syphilis, maintained by Hagermann, did not exist for him. The os tympanale is a bone which may be destroyed, and like other bones be dissolved. In inflammation in adults all parts of the bone must be considered as a whole, and this is so much the more correct in that primary and isolated inflammations affect not solely the mastoid process, but the squamous portion and the tympanic portion as well. In mastoiditis the symptoms develop below the linea temporalis. In

ostitis of the squamous portion, on the contrary, the mastoid process is in the beginning neither red nor painful, while swelling and pain exist above the insertion of the auricle. Oftentimes the inflammation attacks that part of the squamous portion which forms the upper wall of the external meatus, and these are the cases where Stacke's operation is indicated. More rarely an isolated inflammation of the os tympanale occurs, though the writer believes that many of the concentric enostoses of the meatus are to be attributed to an ostitis of this bone.

SECCHI.—**The Physiology of the Middle Ear.**—The writer expressed the opinion that the mechanism of the ossicles of the ear formulated by Helmholtz is not free from criticism. He made experiments in the laboratory in Bologna on cats and dogs in the following manner: Tracheotomy was made and a canula placed in the upper portion of the trachea. The bulla auricularis was then laid bare, opened, and a canula inserted, to which was connected an alcohol manometer. The experiments gave the following results: The air in the drum cavity has a pressure of about 3 *mm* of alcohol higher than that of the external air. This pressure usually occasioned by swallowing may also be a consequence of activity of the muscles of the drum cavity. The intratympanic pressure rises with every sound which calls the attention of the animal; remains unchanged, however, to sounds to which the animal is accustomed. If a series of successively more intense sounds are exhibited, the manometer reacts with many respective elevations. This increase of pressure demonstrated by the influence of sound also occurs if pressure in the cavity is negative. The vowels, *a*, *e*, *i*, *o*, and *u*, increase the pressure. In one case where tenotomy of the tensor tympani was successfully made, the intratympanic pressure decreased under the action of acute and intense sounds. The author declared himself inclined, therefore, to assume that the sound-waves were not conveyed through the ossicles, but rather through the air in the drum cavity, and through the cochlea from the drum head to the membrane of the round window, in keeping with Pascal's theory.

The demonstration of the experiments which were made by the writer gave brilliant results.

MONGARDI called attention to Müller's experiments, which indicate conduction through the ossicles.

GELLÉ could not believe that it was necessary, from the very

beautiful experiments of Secchi, to assume a transmission of the sound-waves through the round window, as he found it difficult to conceive a conduction of tones against the scala tympanica, which was devoid of sense organs while the footplate of the stirrup is in immediate connection with the latter. The round window can only possess a secondary function.

Demonstrations: CHIACINI demonstrated a new method of making anatomical sections of the temporal bone. POLITZER demonstrated microscopic and macroscopic preparations showing the various methods and stages of operative treatment of chronic suppuration of the middle ear. CRESWELL-BABER exhibited instruments.

EIGHTH SESSION—SEPTEMBER 26, 2 P.M.

President, DR. MORPURGO.

Demonstration of instruments (Delstanche).

BRONNER.—**Local Massage in the Treatment of Chronic Eczema of the External Ear.**

GARZIA.—**The Importance of Syphilis in certain Diseases of the Ear.**—The writer called the attention of the Society to the fact that syphilis may be the essential cause of the long duration of certain suppurative inflammations of the middle ear. This cause consisted in the fact that the foundation of the suppuration was a carious spot of bone, and that this carious process was caused by syphilis. In such cases specific treatment had given very brilliant results. The writer had observed seven such cases, five of which were due to acquired, and two to hereditary syphilis. In the former the disease had extended from the naso-pharynx.

GARZIA.—**Pediculated Exostosis of the Meatus.**—The tumor closed the meatus completely. The point of attachment was the anterior side. One-half of the tumor was removed by aid of Burnett's forceps, the remainder with the chisel. The meatus and drum head were scraped out, they being covered by a thick layer of flat epithelium.

This finished the business of the day. On account of lack of time the following articles were not read:

MADEUF.—**Medico-veterinary Investigations on Diseases of the Ear in Mammals.**

A. LEVY, Copenhagen.—**A New Instrument for the Treatment of Acute and Chronic Diseases of the Middle Ear.**

S. OTTOLONGHI, Sienna.—**The Accountability of Deaf Mutes and the Laws.**

COZZOLINO.—**Pathological and Bacteriological Examinations of the Nose, Pharynx, and Cavities of the Middle Ear in Infants and New-born Children.**—A new method of opening the antrum and mastoid cells.

SOFFIANTINI.—**Intramuscular Injections of Calomel in Otology, Rhinology, and Laryngology.**

STOKER.—**An Operation for Intracranial Abscess.**

CARMALT-JONES.—**Removal of the Turbinates for Tinnitius Aurium.**

With universal approval London was chosen as the place for the session of the Sixth International Otological Congress, to take place in 1899.

REPORT ON THE PROGRESS OF OTOLOGY DURING THE THIRD QUARTER OF THE YEAR 1895.

Translated by Dr. WARD A. HOLDEN, New York.

I.—ANATOMY, HISTOLOGY, AND PHYSIOLOGY OF THE NOSE AND NASO-PHARYNX.

By Prof. A. BARTH, Breslau.

A.—ANATOMY.

a.—EAR.

195. TOMKA. Upon anomalies of development of the stapes. *Arch. f. Ohrenh.*, xxxviii., p. 253.

196. DUNN, JOHN. A case of spontaneous dehiscence of the wall of the superior semicircular canal. ARCH. OF OTOL., April, 1895.

196. After removing the brain of a negro, aged about thirty-five, DUNN found a large irregular dehiscence in the right temporal bone, showing several large air-spaces at the petro-squamous junction. Interior to these cells were twenty or twenty-five small dehiscences in the tegmen antri and the tegmen tympani. There was also a transverse dehiscence, 5 *mm* long, of the whole of the bony wall of the superior semicircular canal, so that the ridge of bone usually marking the position of this canal was much reduced in size. The outer layer of the dura mater served as the superior wall of the superior canal.

There was also a large dehiscence over the semicircular ganglion and over the upper covering of the carotid artery. The left temporal bone showed almost the same conditions.

GORHAM BACON.

b.—NASO-PHARYNX.

197. HOPMANN. Anomalies of the choanæ and naso-pharynx. *Arch. f. Laryngol. u Rhinol.*, iii., p. 48, 1895.

197. By means of his method of preparing plastic impressions of the choanæ and pharynx HOPMANN proves that the narrowing and other irregularities of the choanæ and upper pharynx are due not only to syphilis and ulcerations, but also to malposition of the parts from congenital or acquired disturbances in development.

B.—PHYSIOLOGY.

a.—EAR.

198. P. BONNIER. Relations between the ampullary apparatus of the internal ear and the oculo-motor centres. *Comptes rend. de la Soc. de Biol.*, Series X, t. ii., No. 6, p. 368.

199. CRUM-BROWN. The relation between the movements of the eyes and movements of the head. *Lancet*, May 28, 1895.

200. BLOCH. On binaural hearing. ARCHIVES OF OTOLOGY, April, 1895.

199. In an interesting paper read before the Oxford University Junior Scientific Club, CRUM-BROWN discussed the function of the utricle and semicircular canals, as a special sense of rotation in reference to the cause of compensatory movements of the eyeballs in movements of the head, and drew attention to the fact that deaf-mutes, who, besides having some defect of the internal ear, are in a large proportion defective in the sense of rotation, as shown by the absence of the normal jerking of the eyeballs when they are rotated, and by a perceptible insecurity in their gait. URBAN PRITCHARD.

200. BLOCH gives the results of experiments made upon himself in regard to the increase in tone-sensation with binaural conduction, as to the direction of sound, and as to the judgment of the distance of the source of sound. He concludes his paper by giving the characteristics of binaural hearing.

GORHAM BACON.

b.—NASO-PHARYNX.

201. ZWAARDEMAKER. The physiology of smell. Leipzig (W. Engelmann), 1895.

202. KAYSER. The exact measurement of the permeability of the nose. *Arch. f. Laryng. u. Rhinol.*, vol. 3, p. 101, 1895.

202. KAYSER has made verifying experiments on Zwaardemaker's investigations, by introducing tubes into the nose which can be obstructed to any degree desired. No practical conclusions can be drawn from his results.

II.—PATHOLOGY AND THERAPEUTICS.

By Dr. ARTHUR HARTMANN, Berlin.

MISCELLANEOUS.

203. DANZIGER, F. Contribution to the questions of the history and etiology of cancer of the ear. *Monats f. Ohrenheilk.*, No. 7, 1895.

204. BRUCK. Upon a neurosis of the maxillary articulation having a course like that of a disease of the ear. *Deutsche med. Wochenschr.*, No. 33, 1895.

205. GOLDFLAM, S., and MEYERSOHN, S. Upon objectively perceptible noises in the ear and head. *Wien. med. Presse*, Nos. 17, 18, 1895.

206. CAPEDER, C. J. Upon cases of diplacusis binauralis. Dissert. Bâle, 1895.

207. SPIRIG, W. Upon a unilateral, objectively audible noise emanating from the ear in a case of aortic insufficiency. *Corresp.bl. f. Schweizer Aerzte*, No. 8, 1895.

208. EITELBERG, A. Upon aural affections in blood-relations. *Wien. med. Wochenschr.*, Nos. 20 and 21, 1895.

209. BLISS, A. A. A contribution to the study of deaf-mutism. *Med. News*, Aug. 10, 1895.

203. DANZIGER'S patient, a woman of fifty-four, who has suffered from otorrhœa from her tenth year, had a whitish-red tumor apparently springing from the posterior wall of the canal. On attempting to remove it, it was found to fill the tympanic cavity whose walls were carious. The growth was a pavement-celled epithelioma. According to the author, epithelioma of the tympanic cavity only develops after chronic otorrhœa. KILLIAN.

204. In Bagnisky's clinic five cases were observed of neuralgia of the articulation of the lower jaw that BRUCK placed in the catagory of Esmarch's joint neuroses. The patients were led by the severe pain to believe that they were suffering from ear disease, which was not the case. The internal use of arsenic led to rapid improvement. NOLTENIUS.

205. The first case of objectively perceptible noises in the ear reported by GOLDFLAM and MEYERSOHN was muscular and due to contraction of the tensor palati, a rythmic contraction of the soft palate with elevation of the uvula accompanying each sound, which the patient could stop by pressure with the finger.

The second was one of sounds heard on the skull, that were synchronous with the pulse and were accompanied by symptoms of brain pressure.

Compression of the left common carotid stopped the sound and caused no cerebral symptoms. The artery was therefore ligatured, but the sounds returned four hours later. The patient died some weeks later, but no autopsy was obtained.

In conclusion the author reports a rare case of perception of a venous bruit in the ear, that could be heard objectively with the stethoscope. POLLAK.

207. In cases of aortic insufficiency it is well known that sound can also be heard over smaller arteries. In SPIRIG's case an intermittent, weak, blowing sound synchronous with the pulse was heard through the otoscope. No sound was audible on the mastoid process or at the vertex, but one was heard over the right carotid, subclavian, and brachial arteries.

208. By a material consisting of 262 individuals which were grouped according to relationship, EITELBERG shows the effect of heredity not only upon chronic nasal, pharyngeal and aural catarrh, but also upon purulent inflammations of the middle ear. POLLAK.

209. BLISS examined 546 pupils, and says that "the lessons to be learned from these statistics and those of other observers bear relation mainly to the prevention of deafness in infancy and early childhood. We have seen that, excluding the unfortunate victims of inherited weakness and disease, to whom the congenital deaf-mutes probably belong as a class, we have large groups of individuals whose total deafness (and resulting mutism) has developed at an early age, and was apparently of such nature in the beginning as to have allowed of cure had the aural conditions been recognized in time and treated judiciously. GORHAM BACON.

INSTRUMENTS, METHODS OF EXAMINATION, AND TREATMENT.

210. BISHOP, S. S. The dilator in diseases of the air passages and the ear. *North Amer. Practitioner*, July, 1895.

211. CASSELBERRY, W. E. Electrolysis by a current controller for the reduction of spurs of the nasal septum. *N. Y. Med. Journ.*, Aug. 3, 1895.

212. SCHEPPEGRELL, W. A new and simple method by which cautery irons may be electrically heated almost instantaneously. *Med. News*, Aug. 10, 1895.

213. DEES, W. W. A self-retaining nasal speculum. *N. Y. Med. Record*, July 27, 1895.

214. VEEDER, A. T. An air pump and nasal inflator. *N. Y. Med. Journ.*, July 20, 1895.

215. BRANDAGEE, W. P. A new adenoid forceps. *N. Y. Med. Record*, Aug. 3, 1895.

216. BORS, LOUIS. A new mouth gag. *N. Y. Med. Journ.*, July 21, 1895.

217. FREUDENTHAL. Electro-vitratory massage of the ear, nose, and throat. *Ibid.*, Sept. 28, 1895.

210. BISHOP uses a dilator in treating ear diseases by which vapor (being not properly a spray but so fine that it resembles a fine cloud) is produced under high pressure and may be impregnated with either volatile or non-volatile medicaments. With the dilator, the writer medicates the tympanic cavity with a ten per cent. solution of camphor-menthol in lanoline—without unpleasant results. The nozzle of the dilator is fitted into one nostril while the other is held tightly closed as in Politzeration. The cheeks are fully distended with air and the current is turned on from the compressed air reservoir. The current is repeatedly interrupted by the cut-off so as to alternately fill the middle-ear with the vapor and allow it to escape. This with the pneumatic otoscope, Bishop finds of great value in the treatment of dry catarrh of the middle ear. GORHAM BACON.

211. CASSELBERRY does not intend to substitute electrolysis for the surgical method of removing excrescences or spurs of the nasal septum, with the knife, saw or drill, but to determine its exact limitations. He adopts the Edison electric light circuit for this purpose by means of lamp resistance and the McIntosh current controller. The latter is composed of resistance coils arranged in two rows, with sliding contacts to each. The coils on the left divide the electro-motive force into tenths, the contacts forming the decimal slide, while those on the right divide it into hundredths, these contacts forming the centesimal slide, which

add a fraction to the former. In order to reduce the initial circuit of the decimal division, a series of lamps representing a current of sixteen candle power is placed in the current, which reduce the original electro-motive force from 110 to 55 volts. The required amount of from 15 to 40 milliampères can thus be easily obtained. Casselberry uses the bi-polar method exclusively by means of two parallel needles of from 15 to 20 *mm* in length, about $\frac{1}{2}$ *mm* in thickness, which are about 3 *mm* distant from one another, are made of irido-platinum and placed into a handle like those used for galvano-cautery. He has treated ten cases, classed them into three types, *viz.*, I., the strictly cartilaginous spurs, II., the mixed cartilaginous and bony spurs, and III., the bony spurs. Type I. can be thoroughly removed by electrolysis at from one to three sittings, but the surgical method is far superior ; Type II. is also better treated surgically ; Type III, cannot be treated by electrolysis for electrolysis does not remove bone. It is powerless also in the correction of deviated septa, but it is a valuable addition on account of the absence of hemorrhage, the efficiency and convenience of its application, especially in cases in which surgical interference is declined. M. Toeplitz.

212. A metal when dipped into a jar containing a watery solution of borax and sodium carbonate, becomes red hot after a few seconds and even melts, if held there longer. The jar is connected with the terminal of a 230-volt Edison current, the positive wire being attached to lead at the bottom, the negative one passing across the top. The metal to be heated is connected with the negative wire. This method, first seen by Casselberry at the World's Fair at Chicago, was found very useful in arresting an alarming hemorrhage after tonsillotomy, which the Pacquelin had failed to control. M. Toeplitz.

213. To the back of the spring of a speculum (Bosworth's), controlled by a set screw, a slotted nib is welded, which is hinged adjustably to a bar, for its use on either side, and runs to a ball and socket-joint at the head-piece of a forehead mirror worn by the patient. M. Toeplitz.

214. Veeder has devised rubber bags to be connected with an air-pump for inflation, which are inserted into the nostril and cut off after inflation and ligation. He has designed three forms with or without breathing tube in the centre and uses them after operations for straightening the septum and for controlling intranasal hemorrhages. M. Toeplitz.

215. BRANDEGEE'S instrument is an avulsion and cutting forceps. The cutting blades do not cross, so as to leave a space for the uvula. It can be taken apart and rendered aseptic.

M. TOEPLITZ.

216. The instrument is composed (*a*) of two steel plates, like those in the Denhard mouth gag, for fixation of the teeth; (*b*) two connecting rods with two round plates, by which, when pressed upon, the mouth is opened; (*c*) a spiral spring between the two plates around the upright, thicker rod. If the gag is used on the other side it has to be turned over. Boos claims for his gag the following advantages: It can be easily inserted and well controlled by the operator; it is self-retaining and can be taken apart. The instrument is made by Tiemann & Co.

M. TOEPLITZ.

217. FREUDENTHAL'S instrument has been described in vol. XXIII., p. 357, of THESE ARCHIVES. An attachment for the exercise of pressure upon the membrana tympani is added.

M. TOEPLITZ.

EXTERNAL EAR.

218. Voss. On foreign bodies in the ear and the results of attempts at extraction. *Arch. f. Ohrenheilk. Petersburgh med. Wochenschr.*, No. 23, 1895.

219. DUNN, JOHN. A note on the treatment of otitis externa circumscripta with salicylic acid collodion. THESE ARCHIVES, April, 1895.

218. Voss reports a case of death caused by awkward attempts to remove a foreign body from the external canal. A girl of five had pushed the kernel of a carob bean into the ear and four physicians had endeavored to extract it. When examined in narcosis the foreign body was found to be driven into the typmpanic cavity, and there was a sanguinolent exudation. Temperature, 39°. After detaching the auricle and widening the canal the foreign body was readily removed. Half of the drum membrane was destroyed and the malleus fractured. After the operation the child became somnolent and comatose, convulsions came on, and death followed in two days.

219. DUNN recommends the following to be applied in cases of furnucular inflammation of the external meatus:

Rp. Acid salicylic, ʒ i.
Collodion, ℥ i.

GORHAM BACON.

MIDDLE EAR.

220. BACON, GORHAM. A case of cerebellar abscess as a result of chronic suppurative otitis media. Operation; death; autopsy. *Amer. Journ. Med. Sciences*, Aug., 1895.

221. BARKAN, A. Abscess of the brain following suppurative otitis media. *Occidental Med. Times*, June, 1895.

222. HOOVER, PIERCE. Tincture of iodine in otitis suppurative chronica. *N. Y. Polyclinic*, Aug., 1895.

223. BUCK, A. H. Comparatively painless mastoid disease. *N. Y. Med. Record*, July 20, 1895.

224. ABBE, ROBERT. Sinus pyæmia and jugular thrombosis. *N. Y. Med. Record*, July 27, 1895.

225. BURNETT, C. H. The prevention of mastoid empyema. *Med. News*, Aug. 17, 1896.

226. CHEATHAM, W. A case of otitic abscess in a diabetic with a fatal result. *Cincinnati Lancet-Clinic*, Aug. 10, 1895.

227. RANDALL, B. ALEX. Pneumatic massage by the finger tip in catarrhal deafness. *Philadelphia Polyclinic*, Sept. 28, 1895.

228. BANE, WM. C. Inflammation of the middle ear with involvement of the mastoid. Report of cases. *Denver Med. Times*, Aug., 1893.

229. PITTS, BERNARD. A case of otorrhœa, lateral-sinus thrombosis; operation; recovery. *London Lancet*, Aug. 10, 1895.

230. KNAPP, H. History and autopsy of two cases of fatal otitic brain disease. ARCHIVES OF OTOL., April, 1895.

231. VULPIUS. Three cases of influenza-otitis with epidural abscess. *Ibid.*

232. CLEVELAND, A. H. Right suppurative otitis media; extensive thrombosis, beginning in right petro-squamous sinus; left cerebellar abscess. *Ibid.*

233. HERZOG, M. A Stacke mastoid operation, followed by an epileptic attack. *Ibid.*

234. DENNIS, D. N. Cases of empyema of the frontal and ethmoidal sinuses, causing orbital tumors. *Ibid.*

235. MARCHAND. Mastoiditis, complicating otitis. *Soc. de Chirurg.*, 26, xii.

236. GRADENIGO. On the operative treatment of chronic purulent otitis media. *Allgem. Wiener med. Zeitung*, Nos. 39 and 40, 1895.

237. OPPENHEIM. On the character of the aphasia with otitic abscess of the left temporal lobe. *Fortschr. der Med.*, No. 18, 1895.

238. BERGMANN. On some advances in brain surgery. *Report of the German Surgical Society*, 1895.

239. SPIRA. On sinus-thrombosis and pyæmia, following otitic media purulenta. *Wiener klin. Rundschau*, Nos. 30–33, 1895.

240. VOSS. A contribution to the operative treatment of sinus-thrombosis. *Arch. f. Ohrenheilk.*, xxxix., p. 184.

220. BACON's patient, an Irishman, aged thirty-one, was first seen November 23, 1894. He had had chronic purulent otitis media on the right side for five years previously. The drumhead was entirely destroyed, and granulations were formed at the entrance to the attic. There was no pain nor tenderness over the mastoid.

December 11th, the patient was admitted to the Infirmary. Six days before this, he commenced to have nausea, vomiting, and vertigo, which had persisted up to the present time, the discharge being less in quantity. There was also a staggering gait. Bone conduction almost lost.

It being impossible to have proper drainage from the attic, the mastoid was opened with chisels down to the antrum, and the latter was found filled with granulations, which were removed. The mastoid was very dense and as hard as ivory. Free drainage was established. There was at first a slight improvement, but three days later the patient had a severe attack of vomiting, and he soon began to complain of a severe pain on the top of his head—symptoms of right facial paralysis developed.

A diagnosis of cerebellar abscess was made on December 24th, on account of the following symptoms, viz., slight œdema of the right optic nerve, severe headache, vomiting, intense vertigo on motion, a staggering gait, facial paralysis, slow pulse, and temperature but slightly above normal.

December 25th. The patient was etherized, the previous mastoid opening was enlarged, and the lateral sinus exposed. The latter was found normal. A disc of bone *2 cm* in diameter was

then removed at a point 5 *cm* behind and 6 *mm* below the centre of the external and meatus

Different portions of the cerebellum were explored, but no pus was found. A disc of bone was then removed at a point 5 *cm* directly above the centre of the external meatus, and the brain explored, as well as the tympanic cavity, but as before with a negative result.

For the first few days after the operation, there was less headache, dizziness, and vomiting, and the facial paralysis was less marked ; but subsequently the headache became severe again, and the vomiting returned.

The patient gradually failed, and died January 15th, three weeks after the operation.

At the autopsy, the vessels of the pons and medulla were found very much distended. The right lateral lobe of the cerebellum was enlarged, and there was softening of the anterior external two thirds of the right lobe. On division of the right cerebellar hemisphere in the horizontal plane, an abscess containing thick, fetid pus was found within the hemisphere in its anterior part, measuring 4.5 *cm* antero-posteriorly, and 3 *cm* transversely. The cavity of the abscess was surrounded by a wall 3 *mm* in thickness. The abscess obliterated entirely the corpus dentatum and its interior limit encroached upon the middle cerebellar peduncle. The third and eighth nerves had undoubtedly been compressed by its inner portion. There was no evidence of meningitis over the surface of the cerebellum or anywhere else, so that the operation had been practically without harm to the patient.

The autopsy showed that the pus was so thick that it could not have been removed by even a large trocar and canula ; and the only relief that could have been afforded would have been by an enormous incision into the cerebellum and by dissecting out the wall of the abscess. This would have been almost absolutely impossible. GORHAM BACON.

221. BARKAN'S patient, aged thirteen, never had an earache before present attack. She had pain in the left ear on November 1, 1894, for which simple remedies were applied, and the pain ceased for a couple of days, but soon recommenced. On November 4th she had a sore throat, and the ear began to discharge, the pus being very copious, greenish-yellow in color, and free from odor. She had no pain at this time. On November 10th, she again complained of headache and dizziness, and about two

weeks later, there being some tenderness but no swelling or redness of the skin over the mastoid, leeches were applied, and followed by ice-bags.

On November 23d, the temperature varied from 98.5° to 102° F., and at 2 A.M. she suddenly had severe pain in the head, and later was in a stupor. The pulse was regular and good, and the discharge less in quantity. There was pain on pressure over the mastoid. The mastoid was immediately opened, and found completely eburnated. During the afternoon, the patient was quite conscious and had no pain, but during the night the pain returned and the temperature rose to 101° F. There was no optic neuritis. She finally became wildly delirious, with head bent back, and the temperature rose to 102° F. She died on the following day.

Autopsy.—Membranes of brain but slightly congested. In the lymph spaces following the vessels of the pia mater there was more or less pus. There was considerable pus in the lymph spaces on the surface of the cerebellum. The under surface of the temporo-sphenoidal lobe, lying immediately over the petrous portion of the temporal bone, was softened and broken down, forming an abscess about the size of a hen's egg. The dura was but slightly congested, and was thickened over an area of about a quarter of an inch in diameter. The bone showed no perforation. GORHAM BACON.

222. In obstinate cases that have resisted the usual treatment, HOOVER applies with cotton on the end of an applicator or probe, tincture of iodine, which is to be pushed through the ruptured drum membrane. If small, the perforation should be enlarged. This application should be performed two or three times per week. After making application, a piece of cotton should be pressed against the membrane. The writer claims to have had excellent results from this plan of treatment, and reports four cases in which the discharge ceased after using the iodine.

GORHAM BACON.

223. During the early part of this year BUCK has encountered a few cases in which the symptom pain has occupied a markedly subordinate position. He reports four cases, all of them of an acute type and all characterized by pain at the onset, that is when the inflammation was mostly confined to the tympanum. After this initial period, which lasted from a few hours to two or three days, there was either no pain at all as in Cases II. and III., or the pain was of such a migratory character and so little pro-

nounced in Case I., as scarcely to attract the attending physician's attention to the ear as its starting point; or finally, as in Case IV., this symptom only developed when some special exciting cause like violent physical exercise was brought into play as a means of calling it forth.

BUCK's explanation is that possibly among the various living organisms which, in suitably constructed mastoid processes, produce serious inflammation and ultimately destruction of the tissues involved, there may be one or more species that create toxins possessing a decidedly anæsthetizing power over sentient nerve fibrils. As a proof of the reasonableness of such a belief, he refers to the painlessness of tubercular inflammations of the middle ear. He sums up as follows:

First, serious disease of the mastoid process may coexist with an insignificant amount of pain in the affected region; and second, of all the physical evidences of disease in this part of the temporal bone the one that is most rarely lacking is a prolapsed condition of the skin lining the upper and posterior wall of the external auditory canal, in close proximity to the membrana tympani. GORHAM BACON.

224. ABBE read the histories of four cases as follows:

CASE 1.—Sinus pyæmia and jugular thrombosis; Ballance's operation; recovery.—The patient, a nurse, aged thirty-two, two weeks before the operation had an acute purulent nasal discharge for which she was treated. This continued for ten days and was improved, though she had an earache with continued headache. There occurred, however, spontaneous perforation of the drum-head, with discharge of pus from the left ear. A few hours later she had a violent chill, with a temperature of 105° F. There was no pain, tenderness, or œdema over the mastoid. Her temperature ranged from 104° to 105° F. for three days. Chills were followed by delirium and the headache continued. She became semi-comatose, and the respirations were shallow and the pulse thready, 120. There was great tenderness over the jugular vein. The common jugular was tied between two ligatures and cut across. The mastoid process was opened, but no pus was found. The lateral sinus was incised in its full extent, and the upper jugular vein also incised. Free irrigation through the incised veins was carried out. The patient recovered.

CASE 2.—Sinus pyæmia and jugular thrombosis; Ballance's operation; death.—The patient was a young woman aged twenty,

who had had a suppurative otitis for a year. Two weeks previously she had symptoms of mastoid abscess. The bone was opened and a small amount of pus evacuated. She subsequently had a chill with a temperature of 104½° F., and head symptoms. At the time of the operation the pupils were even, choked disc, mental lethargy, pulse slow, no external swelling or tenderness on percussion. A disc of bone 1¼ inches behind and 1½ inches above the meatus was removed. The brain was punctured for abscess, but none was found. The mastoid cells and lateral sinus were then investigated, and the latter contained a putrid clot. This was cleared out and the jugular vein tied and washed out. The patient died, and the autopsy showed a limited purulent meningitis covering the right half of the cerebellum, near the end of the diseased lateral sinus, where an opening had perforated from the mastoid cells and communicated also with the lateral sinus.

CASE 3.—Sinus pyæmia with jugular thrombosis; Ballance's operation; septic pneumonia; death on the fifth day.—The patient, a man aged forty-three, had the grippe, followed by an otitis media with perforated membrana tympani and mastoid disease. The mastoid was trephined, but only temporary relief followed. Two weeks later he had a chill, with fever and sweating; slight swelling and great tenderness developed along the front of the sterno-mastoid muscle. The mastoid was opened again and the sinus laid bare. Purulent fluid was withdrawn. The jugular vein was opened at the junction of the facial, and both ligated and the jugular cut above the ligature. The lateral sinus was opened and a thrombus and pus removed, and the wound treated as in the other cases. He died five days later, with a temperature of from 103° to 105° F.

CASE 4.—Mastoid pyæmia, death from septic pneumonia.—Patient, male, aged thirty-seven, developed a grave septic condition from suppurative otitis. The urine contained albumen and casts. The mastoid was trephined, and offensive pus and foul necrosed bone removed from the attic and middle ear. The jugular vein was examined and pure blood was withdrawn, but it was not laid open. The patient had occasional chills, with evidence of pleuro-pneumonia. The lung symptoms increased and he died on the seventh day after the operation.

GORHAM BACON.

225. BURNETT considers that mastoid disease is largely the

result of unskilful treatment on the part of the physician. If dry heat gives no relief to pain, then the only other proper thing to do in acute otitis media is to incise the membrane. Then the canal should be antiseptically drained by means of a strip of iodoform gauze in the auditory canal. Mastoid trepanation alone, he says, does not check chronic otorrhœa. The necrotic tympanic tissues must be removed before the chronic purulency is checked.

GORHAM BACON.

226. CHEATHAM'S patient, aged fifty-six, was first seen Feb. 22, 1895. Pain began that morning in the ear, and there was slight congestion of the drumhead, but no bulging nor any tenderness over the mastoid. Leeches were applied and the ear douched with hot carbolized water. The following day it became necessary to puncture the drumhead, when considerable pus escaped. The patient, however, became very delirious and unconscious. The urine contained albumen and casts. The ice cap and cold coil were applied. At three P. M. the same day the temperature was 102° F,. pulse 130, and respiration 44. At 9.30 it was decided to trephine for pus. The mastoid was opened, but none was found. There was, however, an old sinus leading from the apex of the bone into the cells. The cranium was opened, but no pus was found in the sinus nor in different portions of the brain. He died forty-eight hours after he first had pain, and two hours before death there was a sudden gush of a black, granular looking semi-fluid from his nose, about a pint in quantity. It proved to be blood and pus. The patient had had mastoid disease about fifteen years before. He was a sufferer from diabetes, although during his illness the sugar disappeared from the urine. He was a champagne drinker. GORHAM BACON.

227. For the tragus pressure of Hommel, RANDALL substitutes another method as follows : He teaches the patient to place the palmar surface of his middle finger upon the tragus, reaching so far back that when the tragus is drawn strongly forward the finger can just be slipped into the meatus without having the nail scratch the back margin. In this way a considerable suction is obtained. GORHAM BACON.

228. BANE reports five cases, the first one being a patient who had chronic purulent otitis media with perforation in the upper posterior quadrant of the right drumhead, with implication of the mastoid cells. He disappeared from observation, but in two months' time returned. Below the right ear was a swelling the

size of a goose egg. From the mastoid downward and backward the tissues were swollen and boggy; the posterior auricular glands were indurated and very much enlarged. At the operation, when the mastoid cells were opened, the disease was found to have extended through the under surface of the mastoid into the tissues of the neck. The abscess was opened.

The second case was one of acute purulent otitis media, followed by inflammation of the mastoid cells, in which it was necessary to remove the entire cortex. The mastoid was filled with pus, granular tissue, and carious bone.

The third case was one of acute otitis media, with perforation in the Shrapnell's membrane. Pain and tenderness over the mastoid developed, and it became necessary to trephine the same. The latter did not contain pus, but the cells were engorged.

The fourth case was a patient aged thirteen, who had acute otitis media with tenderness over the mastoid. This case recovered without operation.

The fifth case was one of acute otitis media with mastoiditis. The patient, male, aged forty-one, had pain in the right ear, mastoid, and side of head. Leeches and ice were ineffectual, so that later the mastoid cells were opened, and they were found engorged and broken down. The patients all made good recoveries. The author believes that "with a thorough knowledge of the anatomy of the mastoid and adjacent parts, the operation can be done antiseptically without fear of bad results."

GORHAM BACON.

229. In PITT's case there was no tenderness along the course of the internal jugular vein. Internal strabismus was noticed on the affected side, with blurring of the disc and enlargement and tortuosity of the retinal vessels. After ligature of the vein, recovery was slow and broken by rigors on four occasions.

230. KNAPP's first case was one representing a typical abscess in the temporo-sphenoidal lobe, caused by chronic suppuration of the middle ear and ending fatally from cerebral pressure due to a large abscess without further complications. The second was a most unusual case: The patient, aged twenty-four, had an acute purulent otitis media of the left ear with mastoid inflammation. The cells were opened and a small amount of pus evacuated. A disc of bone was removed from the squama of the temporal bone and the brain examined, but no abnormality was

found. At the autopsy, on removing the temporal bone, the upper part of the tympanic cavity was full of pus which collected along the dilated semicanalis pro tensore tympani in the tissues surrounding the tube and formed a prominence in the upper pharyngeal cavity, an otitic retro-pharyngeal abscess connecting with the middle ear. GORHAM BACON.

231. In all three cases, during or after an attack of influenza, a purulent otitis media with violent symptoms developed, assuming a more subacute character in the course of a few weeks. The drainage of the tympanic cavity not being sufficient, the inflammation and suppuration invaded the mastoid cells and the posterior cranial fossa ; in two cases also the middle cranial fossa. Operation and recovery in all. GORHAM BACON.

232. CLEVELAND'S case was that of a child, aged six, who gave a history of earache during the previous winter. When first seen, there was a copious discharge from the right ear with two perforations in the drumhead. The patient died. At the autopsy, the petro-squamous sinus on the right side was found abnormally large and deep. At its anterior extremity, necrosis had taken place, and pus had entered the sinus causing a thrombus, extending backward into the lateral sinus. The thrombus extended down into the jugular vein and around posteriorly into the left lateral. The membranes of the brain, except over the sinuses and in the left cerebellar fossa, seemed normal.

GORHAM BACON.

233. HERZOG'S patient, aged nineteen, a well nourished man, never had previously an epileptic attack, nor were any of his family subject to nervous diseases. For three and a half years he had had a discharge from the right ear. An operation was performed and the mastoid found eburnated. The antrum was filled with cholesteatomatous masses and granulations. During his convalescence, the patient had a mild attack of influenza, complicated by an epileptic attack. GORHAM BACON.

234. DENNIS reports three cases, the first two being cases of empyema of the frontal sinus. An operation was performed and the patients recovered. The third case was one of empyema of the ethmoid cells, and two weeks after the operation septic meningitis developed and the patient died.

GORHAM BACON.

235. MARCHAND considers it inadvisable to open the cranium through the mastoid. Cerebral abscesses proceeding from the

mastoid are rare (?). Intracranial complications of otitis are rare, particularly with our present therapy. The classical trephining done early is the best method of preventing these. The cranium should be opened only when there are very marked symptoms. DUBAR.

236. Taking into consideration the fact that lesions of the epitympanum and antrum in the majority of cases of chronic otitis come on simultaneously, GRADENIGO believes the safest operative procedure to be the opening of both cavities from behind, *i. e.*, one opens the antrum extensively and then removes the upper and posterior wall of the canal and the outer wall of the aditus and epitympanum. POLLAK.

237. According to OPPENHEIM the disturbance of speech occurring with otitic abscess of the left temporal lobe may be due to a lesion of the sensory speech centre or to an interruption of the tracts uniting this centre with other portions of the cortex. The latter is the more frequent, but both may be associated. The sensory aphasia, which is rarely complete, is mostly combined with paraphasia and amnesic aphasia. The comprehension of words spoken to the patient is not always affected; the inability to use sounds as speech causes amnesic aphasia.

When the tracts connecting the sound centre with the visual centre are involved there is optic aphasia. For example, the patient sees a bell, recognizes it, but can only recollect its name after he has heard it ring. A case of this sort was seen by Oppenheim. In such cases there may be partial word blindness due to the fact that in what the patient hears that portion is not perceived or only imperfectly, the understanding of which is brought about by the associated activity of the sensory speech centre and the visual centre. Thus if we say to such a patient "the banners wave," or "the sails swell," he will hardly understand it, since the sounds do not produce the conception that arises chiefly from the optic spheres. But if we say "have you a headache?" or "are you well?" he understands perfectly.

Oppenheim observed two cases of otitic abscess of the left temporal lobe with this form of acustico-optic aphasia.

H.

After describing the present status of surgery in respect to the operative treatment of brain tumors and epilepsy, BERGMANN (238) passes to a detailed description of the results of the surgical treatment of intracranial suppuration, limiting himself to the

otitic suppuration of the brain, meninges, and sinuses. He states that in 1,000 deaths, no less than 7 are due to otitic brain disease, and in 1,000 acute and chronic cases of suppuration 3–4 fatal brain complications arise, adding, however, that persons suffering from otorrhœa from early childhood frequently live to an advanced age. According to Körner the otitic diseases of the brain, meninges, and sinuses began as a rule at the point where the primary suppuration in the temporal bone extends into the contests of the skull.

Formerly in his brain operations, Bergmann's idea was first to strike the three convolutions of the temporal lobe, but now he takes the course recommended by aurists of first reaching only the tegmen tympani. And even in cases of cerebral suppuration following a septic fracture of the base when the infection has taken place from the external auditory canal, this spot should be sought, for the fracture can be thus found and drainage of the pus established through it. A man having a fracture of the base and a rupture of the drum membrane with hemorrhage from the ear came to the clinic in the second week after the injury, with high fever. Bergmann removed the roof of the tympanum and found pus between the bone and the dura. The patient recovered.

The brain-abscess operation is done by Bergmann in the following way: After disinfection of the region of operation, a cut is made upward just in front of the shallow furrow between the tragus and the helix, and the detachment divided in an arc. The cut-in continued 2–3 *cm* horizontally backward over the mastoid. The periosteum is retracted and the skin and periosteum of the canal drawn forward. A section of the bone is then made 2–3 *cm* upward from the junction of the linea temporalis with the incisura parietalis, and a second parallel section 3–4 *cm* farther forward, and the two united above by a horizontal section. The dura mata is then elevated and the tegmen exposed. When there is obstinate atorrhœa the middle ear should be opened through the mastoid. If there is a suspicion of sinus thrombosis, the sinus must be exposed and examined either from the mastoid or from the exposed upper surface of the pyramid. If it is filled with fœtid pus the jugular vein should be ligatured. Iodoform-gauze tampons are used for the hemorrhage. If an abscess is to be sought in the cerebellum the region behind the mastoid must be exposed and the bone removed with Luër's gouge forceps. The abscess is usually found in the portion of the cerebellum adjacent to the sigmoid fossa. H.

SPIRA (239) reports a case of sinus thrombosis cured by operation, and adds remarks on the indications for opening the mastoid process and on the diagnosis and theraphy of sinus thrombosis.

NERVOUS APPARATUS.

241. DE COLLET. Auditory disturbances in tabes. *Congrès français de médecine interne.*

242. STIEL. A case of labyrinthine inflammation in late hereditary syphilis. *Monatssch. f. Ohrenheilk.* No. 8, 1895.

In 51 tabic patients COLLET (241) found a number of aural affections, mostly of the middle ear and not dependent upon the tabes. Sixteen cases seemed to be caused through the medium of the fifth nerve, there being concomitant anæsthesia, analgesia, lightning pains, loss of teeth, etc. According to his hypothesis there may be auditory disturbance in tabes through the auditory nerve or through the trophic branch of the fifth.

DUBAR.

In STIEL'S (242) case the disease had led to complete deafness and was complicated with left facial paralysis. Antisyphilitic treatment and later pilocarpine injections produced only slight improvement. KILLIAN.

NOSE AND NASO-PHARYNX.

243. DUNN, JOHN. Growth of the aspergillus glaucus in the human nose. *Arch. of Otol.*, April, 1895.

244. FREUDENTHAL, W. The so-called bleeding polypus of the nasal septum. *Annals of Ophth. and Otol.*, iv., July, 1895.

245. WRIGHT. Mycosis of the nose and throat. *N. Y. Med. Journ.*, July, 1895.

246. SIMPSON, W. K. A consideration of some of the more important principles of intranasal surgery. *Ibid.*, Sept. 14, 1895.

247. RICHARDSON, J. B. Epistaxis. *N. Y. Med. Record*, July 27, 1895.

248. HITZ, H. B. Chancre of the tonsil. *Ibid.*, Sept. 28, 1895.

249. EVANS, T. C. Adenoid growths of the naso-pharynx. *Ibid.*, Aug. 31, 1895.

250. HOPE, G. B. Is acute amygdalitis in any way dependent on the rheumatic diathesis? *Ibid.*, Aug. 17, 1895.

251. LANPHEAR EMORY. Two cases of sarcoma of the tonsil. Death from ligation of the carotid in one, and from the growth itself in the second. *Ibid.*, Aug. 3, 1895.

252. DUNHAM, E. K. Case of large round-celled sarcoma of the tongue. *Journ. Am. Med. Sciences*, Sept., 1895, p. 259.

253. WYETH, J. A. An original osteo-plastic operation for the removal of large vascular tumors growing in the vault of the pharynx, the antrum of Highmore, the spheno-maxillary and pterygo-maxillary fissures. *Journ. Am. Med. Asso.*, Aug. 3, 1895.

254. BACON, GORHAM. A case of sarcoma of the neck involving the tonsil and causing deafness in a boy seven years of age. *Trans. Amer. Otol. Soc.*, 1895.

255. DELEVAN, D. B. The influence of chronic diseases of the throat upon certain defects of speech, especially stammering. *N. Y. Med. Journ.*, Sept. 21, 1895.

256. BARR, THOMAS. The treatment of adenoid growths in the naso-pharynx. *Lancet*, Sept. 14, 1895.

257. SHARP, GORDON. A case of chronic glanders in a horse-shoer. *Ibid.*

258. STRÜBING. On ozæna. *Münch. med. Wochenschr.*, Nos. 39-40, 1895.

259. RÉTHI. On the nature and curability of ozæna. *Arch. f. Laryngol.*, ii., 2.

260. LERMOYEZ. General technique of intranasal operations. *Ann. des mal. de l'oreille*, etc., No. 3, 1895.

261. FISCHENICH. On hematoma and primary perichondritis of the nasal septum. *Arch. f. Laryngol.*, ii., 1.

262. KUTTNER. The so-called idiopathic acute perichondritis of the septum. *Ibid.*

263. GAREL. Primary chancre of the septum.

264. RÉTHI. An unusual fibroma of the nasal mucous membrane. *Wiener klin. Rundschau*, No. 21, 1895.

265. LABIT. Syphilitic condyloma of the nasal fossæ.

266. RIPAULT. Vegetating nasal syphilides in the secondary stage of syphilis. *Ann. des mal. de l'oreille*, etc.

267. HAJEK. A case of empyema of the spenoidal sinus with threatening symptoms of distension. Intranasal operation. Remarks on the diagnosis and therapy of empyema of the sphenoid. *Wiener med. Wochenschr.*, 32–33, 1895.

268. REINHARD. A case of primary carcinoma of the antrum of Highmore. *Arch. f. Laryngol.*, ii., 27.

269. GRÖNBECK. Nocturnal enuresis and adenoids. *Ibid.*, 2.

270. SIEBENMANN. On keratosis of the epithelium in the region of Waldeyer's adenoid circle, and on the so-called pharyngo-mycosis leptothricia (hyper-keratosis lacunaris). *Arch. f. Laryngol.*, vol. ii., 3.

271. GAREL. On a form of pharyngitis characteristic of diabetes or albuminuria. *Ann. des mal. de l'oreille*, etc., No. 2, 1895.

272. LERMOYEZ. On polypoid hypertrophies of the tonsil. *Ibid.*, No. 5, 1895.

243. DUNN reports a case of Aspergillus glaucus, and says that the case is interesting as showing that under certain conditions the spores of the aspergillus fungus may develop both mycelium and fruit-heads in the human nose.

GORHAM BACON.

244. The bleeding polypus of German (Lange, Schadewaldt, Heimann, Scherer, etc.) and American (Cobb, Wright) writers is an angioma of the septum. It has no connection with vicarious menstruation, which originates in other nasal regions, and is simply due to traumatism. These are FREUDENTHAL'S views, which are corroborated by a case of his own observation, which occurred in a female, æt. twenty-two, at the locus Kiesselbachii and bled profusely before and after operation, the hemorrhages causing extreme anæmia which persisted even after cauterizations had stopped them. A sister of the patient had died from sarcoma of the tonsil after operation. The microscopical examination revealed the tumor to be composed of connective tissue, an abundance of capillary blood vessels, particularly near the surface, and large endothelia, from which the development of capillaries was uninterruptedly progressing. Three drawings of microscopical sections accompany the instructive paper.

M. TOEPLITZ.

WRIGHT has microscopically found leptothrix to extend into the depressions between the protruberances of naso-pharyngeal lymphoid hypertrophy, but never in the acini of the glands. Indigestion may be an etiological link between dental caries and leptothrix. He reports four cases of females, two of which had white spots in the maso-pharynx, extending in one even to the mucous membrane of the inferior surbinated bodies. The other

two cases occurred in two sisters. WRIGHT believes that the affection gets well without treatment. He appends a beautiful illustration of a section through the tonsil with leptothrix, stained in lithio-carmin, to which some picric acid is added, and one of mycelial threads, stained with gentian-violet and decolorized by *Gram's* method. M. TOEPLITZ.

246. SIMPSON says that the introduction of the principles of modern surgery for intranasal treatment marks a new era in combating nasal disease. Conservative surgery should be maintained in obstructive rhinitis. The comparative immunity from severe results after intranasal operations is due to the physiological protective resistance of the nose, which, when overtaxed, leads to disease. Interference before the establishment of permanent conditions is to be avoided, and then only resorted to on especial indication. The best operation is that which restores the parts as much as possible to their normal state. Intranasal antisepsis is necessary, asepsis impossible. Instruments, hands, and dressings should be aseptic, but tight plugging cannot be endured. The dangers of intranasal adhesions, narrowing of the nasal space, retention and absorption of secretions call for frequent dressing with application of cocaine, peroxide of hydrogen, alkaline antiseptics, and, finally, adhesive powders, containing stearate of zinc with aromatic iodoform. M. TOEPLITZ.

247. RICHARDSON relates a case of epistaxis in a bleeder, aged thirty-eight, female ; the bleeding originated in the junction of the floor of the right nostril and septum, three quarters of an inch behind the external orifice. Posterior plugging by means of BELLOCQ'S canula, together with plugging from the anterior naris with small pledgets of absorbent cotton, one placed upon the other, did not prevent the hemorrhages from returning in regular attacks of from twelve to fifteen hours' duration, until the following solution was given internally :

℞	Hydrarg. bichlorid	gr. j.
	Acid Muriat dil	ʒ ij.
	Tr. Cannab. Ind	ʒ ij.
	Extr. Ergotæ. Fl	ʒ ij.
	Syr. Simpl	℥ j.
	Inf. Quassiæ	℥ ij. ss.
ℏ	Sol. L. Tablespoonf. in water t. i. d.	

M. TOEPLITZ.

248. HITZ'S case, a male, aged twenty-eight, presented upon the left tonsil a large ovoid ulcer covered with a grayish white

necrotic coat. A deep verticle sulcus divided the surface. The base was firm and indurated, the lower border extended further down than usual, approached the median line and forced the pillars asunder; the upper margin was covered with small ulcers. A macular eruption upon chest and abdomen soon followed. The tonsillar lesion rapidly improved under mercurial treatment.

In the bibliography, the reviewer omits BULKLEY'S exhaustive paper upon the subject, which has been reviewed in vol. xxiii., p. 127 of these ARCHIVES. M. TOEPLITZ.

249. The function of the pharyngeal lymphatic ring consists in a phagocytic action, in health destroying the bacilli, but it serves also to convey the tubercle bacilli from its outer surface to the lung tissue, as is evident from Woodhead's researches. EVANS militates against the expectant treatment and the galvano-cautery. He advocates the removal of the growths without anesthetics with Gottstein's curette and Cradle's forceps.

M. TOEPLITZ.

250. HOPE militates against the prevailing theory of the dependence of acute amygdalitis upon the rheumatic diathesis. His arguments are as follows: Rheumatism preferably attacks the sero-fibrous, not the muco-fibrous tissue. Recurring angina is rare in rheumatics. In later life, the tonsil is less subject to inflammation, while the gouty and rheumatic affections become more frequent. The administration of guaiac and the salicylates, therefore, is to be rejected, and also on account of the nauseating and depressing effect and the lack of abbreviating the duration (usually of from five to seven days) of the amygdalitis.

M. TOEPLITZ.

251. After a complete bibliography comprising 71 cases, LANPHEAR reports two cases of his own observation:

CASE 1.—A lady, aged fifty-six, had a swelling of the right tonsil, occluding the pharynx, and a mass, 3 to 4 inches in size, behind and below the angle of the jaw. Paralysis of the right side of face, severe pain. After a preliminary tracheotomy, during which the respiration ceased for twenty-seven minutes after insertion of the tube, consciousness returned. Three days later, through an incision made from the zygoma to the chin along the jaw, and a vertical cut up to the tip of the mastoid, after dissection of the jaw, the parotid and submaxillary glands, the tumor was cleared with ligation of the external carotid. In clipping the attachments, the internal carotid was cut through and the common carotid had to be ligated. The patient did not regain consciousness, and died seventy-two hours after the operation. Complete

hemiplegia and death were due to the lack of establishment of collateral circulation through the circle of Willis. The tumor was a round-celled sarcoma.

CASE 2 occurred in a man, aged sixty-three, as a swelling of the right tonsil, which rapidly grew. Partial removal of the tumor from the mouth. Spindle-celled sarcoma, which soon increased in a few weeks, and terminated the life in six months from the very first beginning.

M. TOEPLITZ.

252. DUNHAM reports a case of sarcoma of the tongue which occured in a man, aged sixty-one, and was removed by Dr. I. D. Bryant. The patient, who was an excessive smoker, averaging about ten pipes a day, had bitten his tongue eight months before the operation, causing a persistent blister, which became irritated by decayed teeth and began to grow hard, after three months, to the size of $\frac{3}{4}$ inch in diameter. It was on the right border of the tongue about an inch from the tip, globular, smooth, without ulcerations, with broad attachment to the tongue. The microscopical examination, which was very exhaustive, proved it to be a round-celled sarcoma, of which twenty-two cases have been reported.

M. TOEPLITZ.

253. WYETH'S patient, aged eighteen, complained at first, December, 1892, of nasal obstruction, and March, 1893, of pains in the head, nervousness, asomnia, and anorexia. June, 1893, a "naso-pharyngeal polypus" was found, which, December, 1893, caused great agony by pressure on the brain. The growth was removed by Dr. Rufus Lincoln, June, 1894, with galvano-cautery, which caused great relief. July, 1894, swelling of left cheek and protrusion of the left eye, with rapid exhaustion of patient; November, 1894 (in spite of galvano-cautery, applied for the last time on December 8, 1894), together with loss of memory, great apathy, anæmia from hemorrhages, and asomnia. On December 12, 1894, the tumor, which originated in the naso-pharynx, had grown into the antrum of Highmore, breaking through its posterior inner wall, and into the spheno-maxillary fissure and the zygomatic fossa, pressing upon the blood-vessels of the eyeball, thus producing venous congestion of the cheek and the side of the face. An original and novel operation was performed and the patient prepared for immediate transfusion, if necessary, by insertion of a pipette into the median cephalic vein of the elbow. Anæsthesia with chloroform was preceded by two injections of morphine. The tumor was exposed by an incision along the temporal arch and around the orbit to the infra-orbital foramen, then

downward to the level of the ala nasi and outward through the cheek to the opening of Steno's duct, the tissues being only dissected off near the orbital cavity and the eye displaced to the right. A key-hole saw, passed into the anterior commissure of the spheno-maxillary fissure, sawed upward through the junction of the malar with the frontal bone, then downward through the floor of the orbital cavity, traversing the infra-orbital foramen and the antrum of Highmore at the level of the alveolar process of the upper maxilla. Fracture of zygomatic process of temporal bone by hook exposed the antrum of Highmore, zygomatic fossa, and the pterygoid and spheno-maxillary fissures. Tremendous hemorrhage ensued. The wound was packed with sponges and transfusion done with excellent result. The wound was exposed again and the tumor removed. By opening the mouth the pterygo-maxillary fissure and zygomatic fossa were exposed. The antrum was packed with iodoform gauze and the bones were replaced without bone sutures, but with stitching of the soft parts. The patient made an uninterrupted recovery. The motion of the orbicular muscle of the lids persisted even after division of the branches of the seventh nerve. (These tumors have been exhaustively described by Heinrich Bensch in his inaugural dissertation, and also by the same author in Voltolini's text-book on the diseases of the nose. Reviewer.) M. Toeplitz.

254. Bacon's patient, a boy, aged seven, was first seen March 16, 1895. The history of the case was that five weeks previously the child complained of pain in the neck just below the left ear, and that in ten minutes' time a swelling suddenly appeared, as if an effusion of blood had taken place. The tumor was moderately hard and tense, but not painful, suggesting an othæmatoma. There was a small quantity of blood in the external auditory canal, and the inferior wall of the same was pushed upward and the drum-head swollen and bulging. The patient was not seen again for ten days. During this time the growth had increased very much in size and was irregularly lobulated. The left tonsil was enlarged. The boy was placed under ether and the growth incised. It was impossible to remove the growth on account of its attachments, so a slice only was cut off for microscopical examination. It proved to be a sarcoma. On March 30th, injections of the toxins of erysipelas and the bacillus prodigiosus into the growth were begun, according to the method suggested by Dr. W. B. Coley. The injections produced a considerable diminution of

the size of the tumor, but abscesses formed at the expense of the tumor which were opened, and two and a half ounces of pus were evacuated.

The patient developed septicæmia and died April 10th, the immediate cause of death being arterial hemorrhage from the tonsil. GORHAM BACON.

255. DELAVAN states that, apart from defects of speech due to obstructions of the vocal resonant cavities, relaxation of the throat, particularly of the soft palate, influences the phonatory act in pronunciation. The central and neurotic origin of stammering is certainly supplemented by local conditions. Marked improvement in stammering has, therefore, followed the removal of obstructions and irritations of the throat, which, however, did not cure it absolutely. It is thus quite rational to eliminate diseases of the throat of stammering children, before the latter are placed under instruction. Paretic or feeble soft palates may be strengthened by galvanism, pronounciation of palatal sounds, exercises of its muscles, etc. M. TOEPLITZ.

256. In a lecture delivered to the students at Glasgow, BARR dealt with the treatment of adenoid growths. After insisting on the importance of early removal, he thoroughly discussed the various methods of operating, advocating the use of Gottstein's curette, or some modification. For anæsthetic, he prefers chloroform, cautiously and sparingly given, to abolish corneal reflex, but not those of cough and swallowing. He drew attention to the importance of having a competent anæsthetist with special experience, who would not leave the patient until satisfied that he is safe out of the anæsthetic. For after-treatment, rest in bed for two days and confinement to the house for a week, and no local treatment whatever. As regards hemorrhage, he has found it very rare, and advocates the sucking of ice for twenty-four hours and avoidance of hot liquids and solids. In every case, if bleeding is severe, he employs pressure upon the roof of the pharynx by means of forceps holding a fold of cotton moistened with some styptic. If enlarged tonsils are also present, he prefers to remove them without an anæsthetic some time before operating on the growths. For persistent mouth-breathing after all mechanical obstruction has been removed, he first causes the patient to sit still for fifteen minutes, twice or thrice daily, with the mouth closed, and if after some time this proves insufficient he employs some mechanical appliance which is worn at night.

257. On coming under SHARP'S observation the patient, aged twenty-three years, was found to have a foul, watery discharge, tinged with blood and mixed with pus, from the left nostril ; the nostril was inflamed, and covered with black sloughs, which on being removed revealed an ulcerated surface ; the left eye inflamed and discharging foul watery matter ; below the eye the tissue of the face had sloughed away, exposing the bone covered with black sloughs. No syphilitic history. At the end of three months the temperature rose and a considerable area of the superior maxilla was laid bare, the side of the nose having nearly disappeared. Inside the mouth the hard palate was covered by a black slough, and an opening led from the mouth to the opening at the side of the nose. The disease rapidly extended, the patient dying from exhaustion, having been ill with the disease for fifteen months.

258. STRÜBLING made a bacteriological examination in one hundred cases diagnozed ozæna and found in every one the bacillus of ozæna, which is not found in other diseases. He believes that the bacillus causes a hypertrophic inflammation leading later to an atrophic inflammation. MÜLLER.

259. RÉTHI understands by ozæna that chronic nasal catarrh which has a specific and characteristic odor. In the mucosa he always found fatty degeneration of the glandular and infiltrating cell, and a transformation of the epithelium into pavement epithelium with thickening of the vessel walls. Superficial cauterization of the entire diseased membrane with the galvano-cautery, chromic acid or trichloracetic acid lessens or destroys the odor.

ZARNIKO.

261. According to the experience of FISCHENICH hematoma of the septum arises most frequently from trauma, although a fracture of the cartilage is not necessary. The blood is rarely absorbed spontaneously and the usual termination is suppuration or the formation of a serous cyst. Early incision is indicated. The author reports also two cases of primary perichondritis of the septum. In both cases a painful swelling of the nose came on with general malaise and a soft, red tumor appeared on the septum, from which a clear serous fluid escaped on puncture. The cartilage was perforated. In one case the cause was not discovered, the other was due to carious front teeth in the upper jaw. Both cases were cured after free incision.

ZARNIKO.

262. KUTTNER's three cases had a similar history. The septum, without discoverable cause, became the seat of an acute inflammation leading to suppurative destruction of the tissues. The febrile symptoms accompanying the affection yield after the pus is permitted to escape. Instead of calling this affection "idiopathic acute perichandritis," as Lublinski terms it, he suggests the name "acute abscess or acute phlegmon of the septum."

ZARNIKO.

263. GAREL reports very convincing cases of chancre of the septum coming on without signs of syphilis elsewhere, and being followed later by the usual secondary symptoms. These chancres he supposed to arise from infection of the septum by means of the fingers DUBAR.

264. RÉTHI removed from the left nostril by means of a snare a tumor 9.5 *cm* long, and 9 *cm* in greatest circumference. It proved to be a hard fibroma, with a pedicle similar in structure to a mucous polyp with some tracts of connective tissue.

POLLAK.

265. LABIT adds another case to the three already published. There developed in a woman rapid symptoms of nasal obstruction. In the anterior portion of both nostrils grayish colored, deeply furrowed growths were seen, which were hard and not compressible. Under antisyphilitic treatment the tumors disappeared rapidly. In the cases previously reported, other secondary signs of syphilis were present with the condylomas. In this case the tumors developed in the tertiary stage. DUBAR.

266. In RIPAULT's case, gray, irregular, soft growths that were thought to be tuberculous were removed, but recurred several times. They were finally permanently cured by mercury. The author emphasizes the rarity of these growths in secondary syphilis. ZIMMERMANN.

267. HAJEK places no importance on the subjective symptoms, but states that the differential diagnosis between ethmoid and sphenoid troubles may be made by rhinoscopic examination. The former is present when the olfactory fissure is wide enough to allow the secretion to be seen coming from the opening, or a probe may be introduced or the secretion washed out with a fine canula. If the fissure is too narrow, the anterior wall of the ethmoidal cells may be opened. In such cases sponge tents are used to widen the fissure. If the middle turbinate is hypertrophied, parts of it should be removed, until the anterior wall of

the ethmoid is reached. When the cells are opened, the therapy consists in injections of nitrate of silver of gradually increasing strength. It is mostly necessary to enlarge the opening, and the author does this by means of a small hook with which he breaks off small bits of bone, or Hartmann's instrument is used. As after treatment he syringes out the cells with 3 % boric acid solution, and injects 5–10 % solutions of nitrate of silver.

POLLAK.

268. In REINHARD's case a diagnosis of empyema of the antrum had previously been made, but on passing a sound through the opening left by removal of a tooth, soft masses were discovered which proved to be an epithelial carcinoma. The upper jaw was removed, but the growth could not be entirely eradicated. ZARNIKO.

In 28 of 198 cases of adenoids, GROENBECH (269) found nocturnal enuresis. In 23 of these the enuresis stopped after the adenoids had been removed, and in several came on again when they recurred. ZARNIKO.

270. SIEBENMANN observed six cases, which he describes. He concludes that Fraenkel's benign tonsillar mycosis or Heryng's pharyngomycosis leptothricia, with its formation of solid horny matter, should be taken from the catagory of mycoses, and put in that of hyperkeratoses of the mucosa. As a product of a less complete keratosis should be regarded the less complete epithelial keratosis which is found in all tonsils, and which is an excellent medium for the development of the organisms of decomposition. The collection of incompletely keratosed epithelium is therefore a constant menace to the surrounding tissues, analogous to cholesteatoma of the middle ear. It is desirable to regard from a common standpoint the keratosis of the pharynx, pachydermia laryngis, leucoplakia oris, the black tongue, rhinitis atrophica, rhinitis anterior sicca, and otitic cholesteatoma, and particularly to give cholesteatoma of the middle ear a place in this catagory, and to do away with the puzzling features of its pathogenesis that have divided aurists and some pathologists.

271. In a man of forty-three, LERMOYEZ found a lobulated tumor of the tonsil that resembled in structure the structure of the normal tonsil, but had some peculiarities.

ZIMMERMANN.

MISCELLANEOUS NOTES.

The SIXTH INTERNATIONAL CONGRESS OF OTOLOGY will meet in London, 1899, under the presidency of Professor URBAN PRITCHARD.

The LIVERPOOL EYE AND EAR INFIRMARY has lately received a *legacy* of £300 from the late Mr. JOHN HUGHES of Sefton Park, Liverpool, and another of £100 from the late Mr. WM. WOOLFALL, of Liverpool and New Brighton.

APPOINTMENTS.

ST. CLAIR THOMSON, M.D., F.R.C.S., has been appointed Assistant Surgeon to the Royal Ear Hosptital.

The Glasgow University has established a lectureship on the Diseases of the Ear, and Dr. THOMAS BARR has been appointed lecturer, the appointment having been offered to him by the University Court (without inviting candidates). The institution of the new chair is a gratifying evidence of the importance now attached to this department, and a just acknowledgment of the unexcelled competency of Dr. Barr.

In the now completed extension of the Vanderbilt Clinic of the College of Physicians and Surgeons (of Columbia University), New York, the Ear Department has received adequate quarters, which it formerly lacked. Professor ALBERT H. BUCK and his assistants now have the facilities requisite for the treatment of patients and drilling of students. In this college, otology, as well as the other specialties, are represented by clinical professorships; the attendance of the clinics is obligatory, and the students are required to pass a satisfactory examination before obtaining their degree.

CORRECTION, BY H. KNAPP.

In my sketch on the life and work of the late Prof. Moos, by an oversight of mine, on page 411 of vol. xxiv. at the end of the sentence: "*In the second series of seven years* (1879–85) *he (Moos) published 47 papers*" the words "*among which 17 in conjunction with* DR. STEINBRÜGGE" have been omitted, and should be added in the above place.

Contents of the last numbers of the *Zeitsch. f. Ohrhk.*

Vol. xxvii., Nos. 3 and 4, issued November, 1895.

STAN. V. STEIN. Disturbances of Equilibrium in Aural Affections. Concluded. Translated in this number. The remainder are translations from the English edition, reports, and reviews; the reports have been translated, the reviews will be.

G. BRUNNER. Diagnostic Value of the Upper and Lower Tone-Limits.

E. BLOCH. The Diagnosis of One-Sided Deafness.

Vol. xxviii., No. 1, issued December, 1895.

BORIS WERHOVSKI. Examination of the Duration of Audition in Diseases of the Middle and Inner Ears (3 plates).

ZWAARDEMAKER. Acoustic Railway-Signals and Sharpness of Hearing.

WALTER HÄNEL. Incipient Perforation of Both Labyrinth Windows, in Tuberculous Caries of the Middle Ear, with Microscopic Examination (2 plates).

Translation from the English edition.

Report on Progress (translated).

Vol. xxviii., No. 2, issued March, 1896.

R. BALDEWEIN. The Rhinology of Hippocrates.

H. ZWAARDEMAKER. An Initial Symptom of Sclerosis.

P. CRULL. Congenital Occlusion of the Right Choana.

E. SCHMIEGELOW. Otitic Intracranial Complication. Operation. Recovery.

Translation from the English edition.

Report on the Meeting of Hungarian Aurists.

Report on Progress. 4th quarter '95. To be translated in our April number.

Book Reviews.

NOTICE.

The Editors repeat that subscribers who wish to read articles in the German Edition that have not yet appeared in the English, or have been reproduced there only in an abridged form, can always obtain, for temporary use, such articles, on application to DR. KNAPP, 26 West 40th Street, New York, for America, and to Mr. I. F. BERGMANN, publisher, 20 Schwalbacher Strasse, Wiesbaden, for England and its Colonies.

NOTICE TO CONTRIBUTORS.

The editors and publishers of the ARCHIVES beg to offer some suggestions to authors who propose to favor them with their contributions.

1. As original communications the ARCHIVES can accept only such papers as have never been printed nor are intended to be printed in other journals. If a preliminary communication on the subject of a paper has been published, the author is requested to state this in the letter accompanying his manuscript. It is understood that contributors to these ARCHIVES and editors of other periodicals will make no abstracts of the original papers published in this journal without giving it due credit for the same.

2. Authors will receive gratuitously twenty-five reprints of their articles. If a greater number is desired,—notice of which should be given at the head of the manuscript,—only the additional cost of presswork and paper will be charged to the author.

3. In preparing manuscript for the compositor it is requested that the following rules be adhered to:

a. Write on one side of the paper only.

b. Write without breaks, *i. e.* do not begin a new sentence on a new line. When you want to begin a new line or paragraph at a given word, place before it in your MS. the sign ¶.

c. Draw a line along the margin of such paragraphs as should be printed in smaller type—for instance, all that is clinical history in reports of cases, etc.

d. Words to be printed in *italics*, should be underscored once, in SMALL CAPITALS twice, in LARGE CAPITALS three times.

4. Authors may receive proofs for revision if they will kindly return them without delay. We beg however to remind our contributors that changes in the copy are equivalent to resetting, causing so much additional expense. We therefore request them, to make, if possible, no alterations at all in their MSS., or, at least, to limit these to what is of essential importance.

CONTENTS OF VOLUME XXV., NUMBER 2.

PAGE

1. The Hearing Power in Cases of Bilateral Congenital Atresia of the Auditory Canal with Rudimentary Auricle. By Prof. **F. Bezold,** Munich. Translated by Dr. WARD A. HOLDEN . . . 127

2. A Contribution to the Diagnosis and Treatment of Cholesteatoma in Otitis Media Purulenta Chronica. By **A. Scheibe,** of Munich. Translated by Dr. A. B. KIBBE, Seattle, Washington 132

3. Contributions to the Bacteriology of Otitis Media Purulenta. By **Leopold Stern,** of Metz. Translated by Dr. A. B. KIBBE, of Seattle, Washington 139

4. A Case of Epithelioma of the Cartilaginous and Cutaneous Meatus and Auricle. By Dr. **Alfred Denker,** of Hagen. Translated by Dr. A. B. KIBBE, Seattle Washington 146

5. A Contribution to the Study of Acute Inflammation of the Middle Ear Produced by the Bacillus Pyocyaneus. By **Orlando Pes** and **G. Gradenigo,** Turin. Translated and abridged by AD. O. PFINGST, M.D., New York 149

6. Examination of the Duration of Hearing throughout the Musical Scale in Diseases of the Internal and Middle Ear. By Dr. **Boris Werhovsky,** of St. Petersburg, Russia. Translated by Dr. H. A. ALDERTON, of Brooklyn. (With 27 curves in Plates I., II., III., of Vol. XXVIII. of German Edition.) 152

7. Report of the Meetings of the Hungarian Otological and Laryngological Society. By **L. Polyák.** Translated by Dr. A. DUANE, New York 182

8. Report on the Transactions of the Section of Otology of the 66th Congress of the German Naturalists and Physicians, Vienna, September 24–30, 1894. Reported by Dr. **Albert Bing,** Vienna. Translated and abridged by AD. O. PFINGST, M.D., New York . 192

9. Report of the Progress of Otology during the Fourth Quarter of the Year 1895. By Dr. **A. Hartmann,** Berlin. Translated by Dr. A. DUANE, New York 197

A.—Anatomy.
B.—Physiology.
C.—Pathology and Therapeutics.

PAGE

10. Book Reviews 231

Die Otitischen Erkrankungen des Hirns, der Hirnhäute und der Blutleiter. By Otto Körner.

Ueber Hörübungen bei Taubstummen und bei Ertaubung im späteren Lebensalter. By Victor Urbantschitsch.

Das Hörvermögen der Taubstummen. Mit besonderer Berücksichtigung der Helmholtz'schen Theorie, des Sitzes der Erkrankung und des Taubstummen-Unterrichts. Für Aerzte und Taubstummenlehrer. By Friedrich Bezold.

Die Behandlung der Mittlelohreiterungen. By J. Michael.

Klinische Beitrage zur Ohrenheilkunde. Mittheilungen aus der Abtheilung fur Ohrenkranke im Allerheiligen-Hospital zu Breslau. By Oscar Brieger.

Enfahrungen uber Hirnsinusthrombosen nach Mittelohreiterung während des Jahres 1893. By A. Jansen.

Die Ohrenheilkunde des Hippokrates. By Otto Körner.

11. Report on the Second Meeting of the American Laryngological, Rhinological, and Otological Society 244

12. Miscellaneous Notes 246

13. Contents of the Newest Number of the *Zeitsch. f. Ohrenhk.* . . . 247

14. Editorial Notice 247